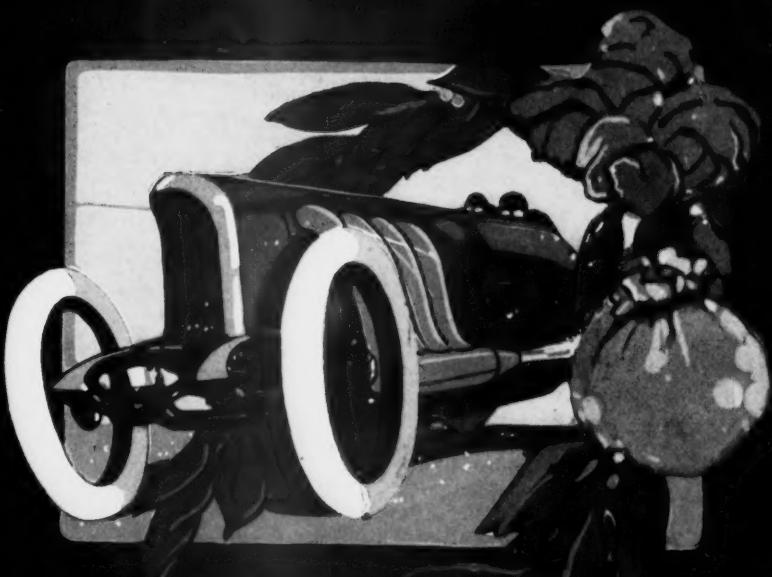


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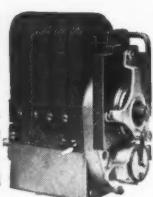


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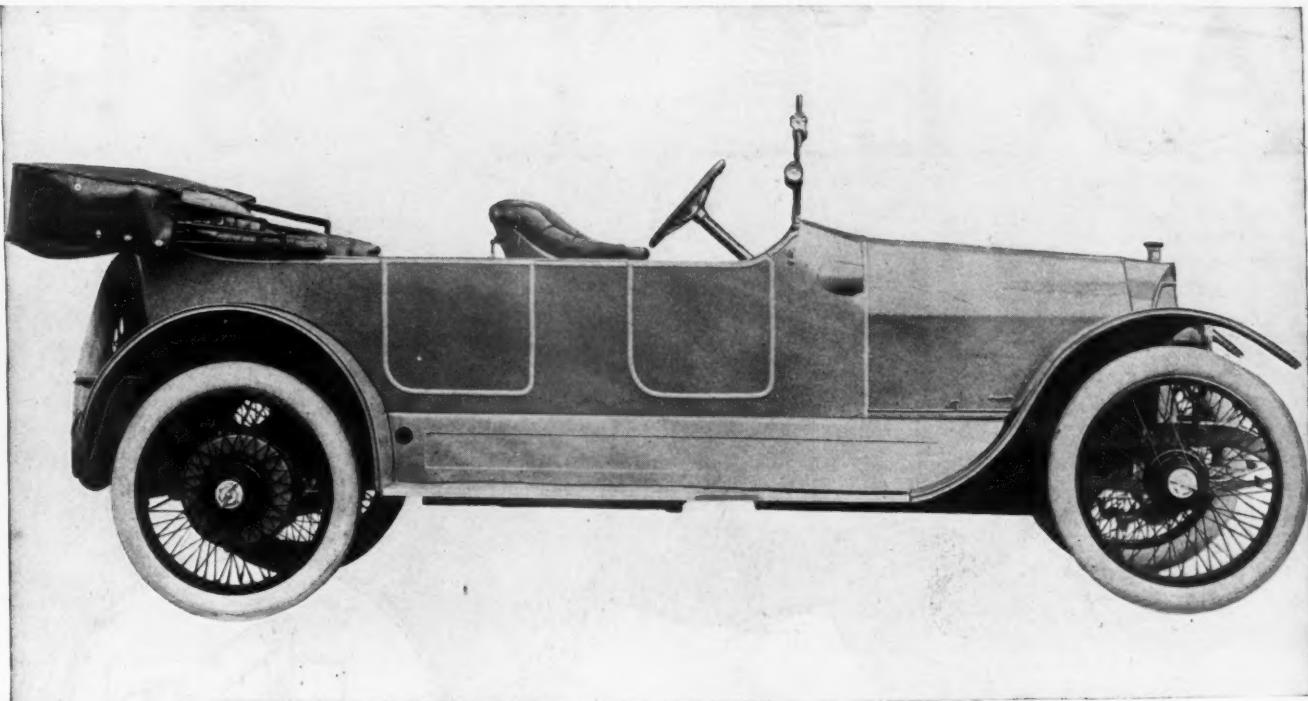
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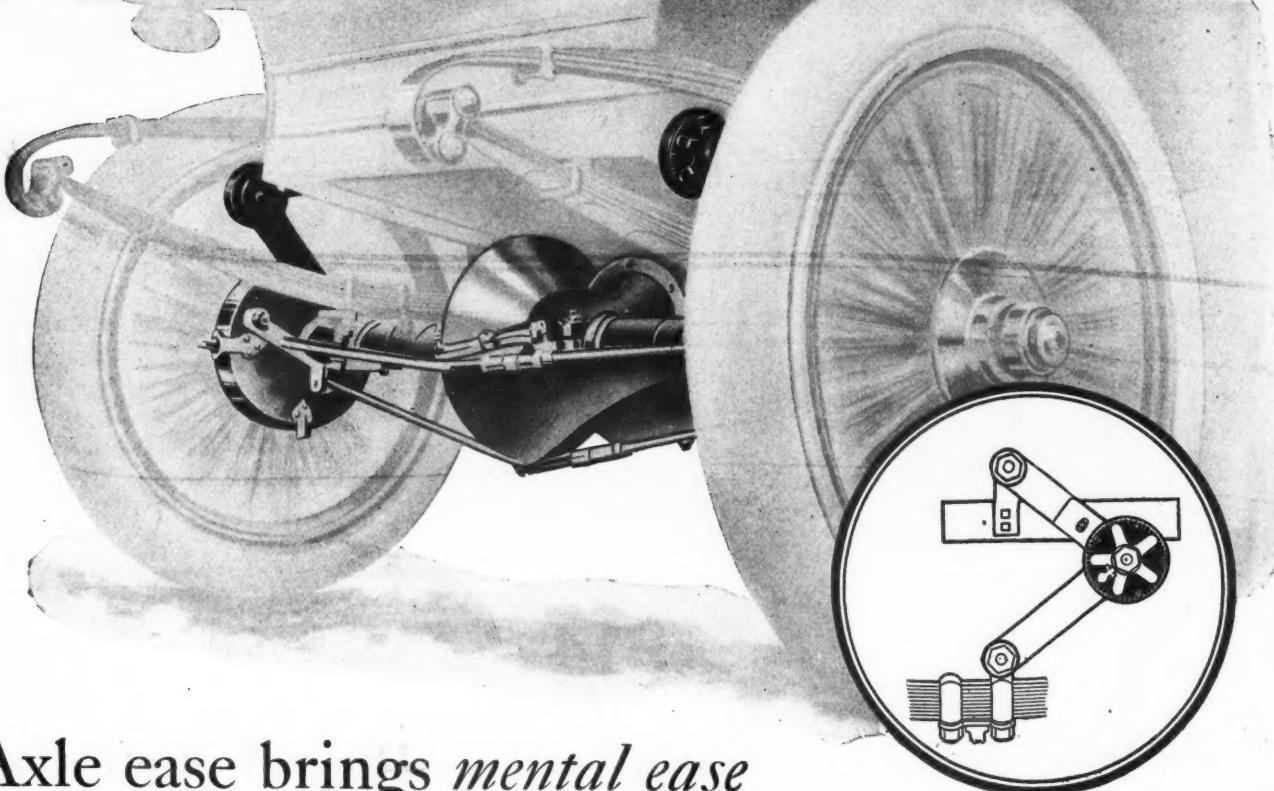
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**Trade Papers First!**

**Mr. Farrington:** I believe the trade paper is an important feature in introducing a new line. Is there a man on our board who does not read trade paper advertising? (All state they do read it.) I thought so. I doubt, however, if we really distrust a manufacturer who does not advertise in the trade papers.

**Mr. Small:** No; you will find some manufacturers who live in the dark ages and don't believe in advertising, who still have goods we need.

**Mr. Zimmerman:** Such manufacturers are not distrusted, but I certainly have more confidence in a manufacturer who advertises.

**Mr. Goldsmith:** A man may be a fool and still be as honest as his smart brother.

**Mr. Farrington:** Now I want to find out where you gentlemen seek for information about new lines of goods. As I call each name, please tell me what is your usual source of such information: **Mr. Thompson**—‘Trade magazines first.’ **Mr. Gordon**—‘Trade papers, traveling salesmen and stocks of other dealers.’ **Mr. Goldsmith**—‘Trade papers, advertisements of metropolitan stores, visits to the market, traveling salesmen, in order named.’ **Mr. Heckler**—‘Trade journals, traveling men and visits to market.’ **Mr. Lynch**—‘Trade journals, traveling men and other dealers.’ **Mr. Tettelbach**—‘Trade journals.’ **Mr. Cole**—‘Trade papers, general magazines, and I offer a reward for items recommended for stock by customers.’ **Mr. Burroughs**—‘Trade papers.’ **Mr. Zimmerman**—‘Trade journals.’

**Mr. Farrington:** That speaks pretty well for the trade papers. Mr. Heckler, can the manufacturer reach and interest you quickest through general magazine advertising, trade paper advertising or a force of traveling men?

**Mr. Heckler:** I believe that trade paper advertising should prove the most valuable to the manufacturer.”—Proceedings of the Advertising & Selling Retailers’ Advisory Board.



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**Specify Dunlop Detachable Wire Wheels On Your NEW Car**

# MOTOR AGE

## Tasmania's Motoring Possibilities

by George M. Hanson—American Consul at Hobart



LOCATION AND FEATURES OF TASMANIA

**A**BOUT 10,000 miles southwest or 15,000 miles southeast of the metropolis of America—half a world away in either case—in the seas which border the “roar-



THE WOODED HILLS OF TASMANIA

*Editor's Note—The following article on Tasmania and its motoring possibilities was written especially for MOTOR AGE by George M. Hanson, American consul at Hobart. In addition to telling of the delights of Tasmanian roads, Consul Hanson strikes a trade keynote when he says: “I have had dealers complain to me that they would like the agency for American cars, but they have been unable to get in touch with the right manufacturers because they do not know where or to whom to write. It would be a good stroke of business for every motor car manufacturer in America to send his catalog to every American consul where it is possible to create a market.” Illustrations from photographs by Beattie, Hobart, Tasmania.*

ing forties” of the southern hemisphere below Australia, lies the evergreen island of Tasmania,—land of the kangaroo, the home of sunshine and beautiful women, and the place whence good health comes. It shows almost a speck on the map, but its area exceeds that of Massachusetts, New Hampshire, Connecticut, Delaware and Rhode Island combined. It is an island of little mountains and big rivers, the

habitat of the platypus and the now exceedingly rare Tasmanian tiger and devil.

The productive soil will grow anything that will not quarrel with a perfectly respectable climate, but the scarcity of tillable land, on account of the mountainous surface, has resulted in the location of widely scattered estates that were more or less isolated until the advent of the motor car. Now, with motor roads

connecting all parts of the inhabited portion of the island, and every farmer and station (sheep) owner in possession of one or more cars, Tasmania practically is a compact whole and a little world of prosperity and contentment by itself—thanks to the American manufacturers of lighter cars.

#### British True to Home Product

Unfortunately the higher priced American cars are not represented here. If they were there is every reason to believe that they would have the same vogue as the lighter cars, which have won on merit such a high place in the esteem of motorists all over the island. It should be remembered, of course, that the people here are practically all British—a great majority of English descent, with a leaven of Scotch and here and there an



DRIVE THROUGH TASMANIA BUSH NEAR MOUNT WELLINGTON

Irish smile. The well-to-do class that can afford high-priced cars has consistently shown a patriotic preference for English makes. For the reason that American cars of the same grade have not yet been introduced into Tasmania, no comparison can be made. However, the generally recognized superiority of American cars of from 20 to 30 horsepower (American) is the basis for assuming that the higher priced cars would show relatively the same points of advantage. The American makes are far and away ahead of all competitors in durability and reliability.

The motor roads of Tasmania all lead to Hobart. From the beautiful capital



PORT ARTHUR, TASMANIA'S FORMER CONVICT SETTLEMENT

city a charming drive climbs gradually up the slopes of Mount Wellington, crossing the uplands on the way to the valley of the Huon. On a plateau 2,000 feet above sea level, the motorists leave their cars in the shade of the various gum (Eucalyptus) trees that cover the entire surface of the island, creating an effect that reminds one of "the wooded hills of Oregon," and stroll along clean, well kept walks, among giant ferns and palms. **Fern Tree Grove Beauty Spot**

The Fern Tree Grove, about half way up Mount Wellington, is one of the beauty spots of Tasmania. The view from the Fern Tree presents a panorama that is remarkable because of its magnificence. Away to the south spreads the great Southern ocean, and a calm day shows the trackless blue for a sweep of 60 miles from left to right without a ripple. The estuary of the Derwent river, singularly like the fjords of Norway and navigable for 60 miles from the ocean boundary, broadens out to the sea and stretches like a waving pennant of blue under the light and shadowy green of the hills. The land is not visible—only the water and the woods. Far to the west lies a primeval forest of gum trees, blackwood, myrtle, cypress and wattle, all hardwoods, that represent at this time an insuperable barrier to the march of civilization. For 100 miles, clear to the west coast, no human finds a habitation, and not until the woods have been laid low by axe and brand, will a foot of the rich soil ever be cultivated. To the east is Hobart, crowning the shore of the Derwent and possessing one of the finest harbors of the world. Already the big liners built for the Australian trade are looking askance at Melbourne port and the beautiful harbor of Sydney, wisely deciding to finish loading their cargoes at

Hobart and taking no chances of going around in the shallower ports of the Australian cities. The new pier, rapidly nearing completion, will accommodate the largest steamers in the world. The outside berth has a clear depth at low water of 60 feet.

A favorite motor trip is across the Derwent, through the quaint old towns of Richmond and Sorell to Port Arthur, the location of the old-time convict settlement. It is another beauty spot for the visitor, and not a few of the inhabitants of Tasmania yet survive who remember the terrible cruelties visited upon the hapless convicts. Little now remains of the prisons and walls.

Port Arthur is situated on a peninsula, connected with the mainland by a narrow neck. At this neck, starved bloodhounds were stationed and woe betide the ill-advised convict who should attempt to escape. Here, also, on both sides, the tiger-sharks were fed so that the waters were always patrolled by man-eaters that made short work of any convict who undertook to swim around the narrow strip to escape the bloodhounds.

#### Roads Built by Convicts

In the vicinity of Port Arthur are the blow-holes, Tasman's Arch and the tessellated pavement. These are natural curiosities in the southernmost part of this southern island and well illustrate the ravages of wind and wave on the solid rocks of the headland. On the way back the tourist remarks on the quality of the road and is told that it was built by convicts. He is also informed that many of the old churches, halls and residences are the result of convict labor. The same with bridges, abutments, walls and all kinds of stone work.

From Hobart, 40 miles up the Derwent valley to the home of Sir Phillip Fysh,

ex-premier of Tasmania, in whose immediate family there are about a dozen motor cars, the motorist finds an excellent road and constantly changing views. The road follows the river and thus traverses the apple orchards and hop fields that produce such wonderful crops in the shelter of the surrounding hills. Apple orchards cover the banks of the Derwent as vineyards do the banks of the Rhine and yield probably a more profitable return. The hop fields comprise the rich alluvial land that occupied in the making the attention of the river for centuries. There is no danger from floods on account of the thick woods which protect the watershed. In this land of sunshine and charm a flood would be a false note in the natural harmony.

At Bushy Park, the home of Sir Phillip, who, at 78, represents the finest type of English gentleman in Tasmania, the motor tourists are always welcome, and it is a favorite stopping place for afternoon tea. Then comes a gradual ascent for miles until the Midlands are reached. Now we are in the game country. A trip into the bush country on either side soon takes one to the haunts of the kangaroo, and still further are the dens of the fierce Tasmanian wolves, known locally as tigers on account of their stripes.

#### Animals Are Marsupials

Is there anyone who does not know that all the native animals in Tasmania are marsupials? That is, they rear their young in a pouch, the same as the kangaroo. This is true of the platypus, the opossum, and all other animals, including wombats and cats, and even of rats and mice. A casual glance at a Tasmanian tiger or devil does not indicate anything different from other extremely savage, carnivorous animals of the same type, but a closer inspection of these species in the private zoo kept by Mrs. Roberts at Beaumaris, Hobart, discloses the marsupial. Is it not strange that in the harmonious world-wide progression of animal evolution the native species of Australia should remain an age behind? It is a fact, however, and science is free to explain the peculiarity any way it sees fit.

In the Midlands country many motor cars are in evidence, but out of every dozen at least 10 will be of American make. This proportion does not hold good in the cities, however, although American cars are much in evidence. This is not remarkable when the topography of the country is considered. The lighter cars are splendidly adapted for the hills and hollows and uneven surface generally. Only last week the agents of an American car placed their order for the ensuing year—an even hundred cars, at a price of approximately \$1,000 each.

All the dealers handle American makes, but all American makes are not equally popular. I have had dealers complain to me that they would like the agency for American cars, but have been unable to get

in touch with the right manufacturer because they do not know where or to whom to write. It would be a good stroke of business for every motor car manufacturer in America to send his catalog to every American consul where it is possible to

create a market for motor cars of any kind.

#### Climate Makes Motoring Popular

A principal reason for the popularity of motoring here is the superb climate. It is practically as easy to run a car in winter as in summer. The fact is that the difference between summer and winter is a matter to be determined largely by looking at the calendar. I might describe it in one word and say the climate is "equable." But that is not enough. The summers are like October in the North Atlantic states of America and the winters like November. There is no snow, except on the uplands, and little frost. The thermometer has such a steady habit, however, of hanging around the freezing point that the visitor is ever kept vacillating between an overcoat and a chill. The people here wear woolens the year round, and though they may be a bit warm on a summer's day, the "sea-breeze," which comes up conveniently from the south pole every afternoon, convinces them that they are sensibly dressed.

Flowers bloom with much the same regularity in June and January. Straw hats and furs are worn both in winter and summer and both are seasonable. Such is the climate of Tasmania; neither too



TWO-ROD WIDE ROAD THAT WINDS THROUGH THE TASMANIA BUSH



MOTOR ROAD ON THE SLOPE OF MOUNT WASHINGTON

hot nor too cold, but cold enough and always invigorating and bracing. It is such an asset that thousands of people from the hot cities of the mainland come over each year to cool off. They often bring their motor cars and spend from 2 to 4

months in this so-called Switzerland of the south. Hobart, and in fact all Tasmania, is the playground of Australia. During the summer the Derwent is the headquarters for the Australian fleet and the fashionable season extends for 5 months.

## Tasmania's Historic Appeal

By J. C. Burton

**A**LTHOUGH very young as the age of countries is commonly computed, Tasmania, situated 40 degrees south of the equator and separated from the largest island in the world by a narrow strait, is not barren of historic charm. Its history dovetails into that of Australia.

Abel Jannsen Tasman, an intrepid Dutch navigator, was the first man to set foot on the heart-shaped island on his voyage of discovery to the Pacific and Indian oceans in 1642. This hardy sea captain of North Holland found here a savage black people, some of them cannibals, who lived in miserable bark hovels, paddled over the waters in roughly hewn canoes and fought with a diabolical war club that, after being sent through the air, returned to the hand of the sender. These aborigines, of whom Tasman wrote in the narrative of his voyage, and their descendants have come under the spell of the "evil eye." They are of Tasmania's past, but on a still tropical night the dreamer in Tasmania can see the fanciful shapes of lithelimbied black men prowling in the dense foliage and hear their paddles dipping in the waters of a moon-swept ocean.

Two-score and 6 years after the voyage of Tasman, the brig of William Dampier, a freebooter and the first Englishman to visit Australia, skirted the shores of Tasmania. Dampier's is the brig that gave the touch of realism to the schoolboy's greatest romance, for it was this ship that took Alexander Selkirk, the Robinson Crusoe of DeFoe's immortal tale of adventure, off the island of San Fernandez. Not until 1798 was Tasmania known to be a separate island and not a part of the Australian continent, and to Captain Flinders, who afterward achieved renown as a navigator with the Sir John Franklin polar expedition, belongs much of the credit for such a discovery.

In the story of Tasmania's colonization the dramatic ticket-of-leave man and deported convicts

play important parts. At the dawn of the nineteenth century penal settlements, not as famous as Australia's Botany Bay, but peopled by brother outcasts from the mother country, were established on the island. At Port Arthur stories still are told of the brutality and savagery pitilessly inflicted upon the bodies and souls of men made into beasts by inhuman treatment.

### Youthful Middy Raises Flag

Discovered in 1642 but its discovery causing the clashing powers of Europe no concern and the scene of sporadic and uneventful explorations for the following century and a half, Tasmania had no need of an official historian until the year 1804 when a youthful "midy," Robbins, raised the English flag at Elephant's bay and took possession of the island in the name of Great Britain. Robbins was sent to Tasmania by the governor of Australia who suspected that the officers of two French ships that had dropped anchor in

Port Arthur were about to plant a settlement in Tasmania and challenge British domain in the Pacific ocean.

### Settlement of Twice Convicted

Fear of French occupation of the island was not the only motive that inspired the English to take possession of Tasmania and make good its claim to the territory by colonization. Among the convicts in the penal settlement at Botany Bay was a gang of desperate characters that the governor wished to get rid of in order to insure himself against revolt. He sought some place remote and inaccessible to which he could deport these menacing felons and selected Tasmania as the cesspool into which convict-populated Australia might pour its poisonous human sewage. Tasmania was destined to be the home of the twice-convicted. Its first settlers were the worst type of criminals and the fruits of such colonization were murder, rape and the infamous Black War.

The natives of Tasmania were a peaceful people. They were as simple-minded as children and unlike the Sepoy of India, the Indian of America, the Maori of New Zealand, and the Zulu of Africa, were ready and anxious to welcome the English settlers as friends. The depraved, inhuman members of the first settlement were not so inclined. They were more beasts than men. They had been flogged so mercilessly in the penal colonies of Australia that they had lost what little sense of justice, what little sympathy they ever possessed, and in the bush of Tasmania found innocent victims on whom in their desperate frenzy they could inflict the same cruelties that they had suffered. To them life was cheap and suffering a trifle.

"It was like emptying the inhabitants of a gaol upon a Sunday school or orphan asylum," writes one Tasmanian historian, in discussing the colonization of Tasmania and the feud between whites and blacks. "To land the twice-convicted on such a stage and amongst such a people was to insure a tragedy."

### Scene of Tragedy

Tasmania's early history is a tragedy. The stealing of native women and children by the whites soon became common. The blacks retaliated and avenged themselves by were multiplied. The feud between the two races became more bitter. A shrunken harvest and a food famine at Port Jackson in 1806 made it im-



A SCENE IN THE TASMANIA MIDLANDS

perative for the officials to turn the convicts loose and permit them to hunt kangaroos in order to obtain food. Many of the convicts turned bushrangers and, brought in close contact with the natives, practiced cruelties and crimes unprintable. Settlers' houses were burned. White women were found pierced with spears. For each white life taken, the convicts demanded a score of black lives to balance the scales of revenge. One murder was atoned for by wholesale massacre and at last there came a bitter, universal constant race war in Tasmania.

The once-peaceful natives became as elusive as shadows. They changed to furtive, swift-footed, desperate creatures. They had been taught cruelty by the whites and learned their lesson well, too well in many instances. They ceased to be a child-bearing race. In this feud children were considered a burden. On the night marches, in the secret attacks upon the isolated cabin of a settler, the cry of a child was a peril to the success of the bloody undertaking. So the natives of Tasmania became a childless race and a childless race is doomed.

#### Savage Leaders Picturesque

The blacks had their leaders, two of whom were most picturesque. One was an Australian black boy, Misquito, who had been sent to Tasmania for the murder of a woman, and escaping from prison took to the bush and found a refuge among the belligerent natives. The other was a dusky Amazon, Walloa, who revenged herself for atrocities suffered at the hands of the whites by spreading panic through whole districts and committing countless murders.

The feud became so widespread that it became a war. Governor Arthur attempted to bring the atrocious and wasting strife to an end. His first plan was to confine the natives to special geographical areas out of which they must not pass and into which the whites were forbidden to enter. This scheme was anything but practical. Difficult as it was to corral the blacks into the districts assigned to them, it was even more difficult to keep the natives—who were nomads by force of habit—there. The distribution of the territory moreover was most unfair. The choicest regions were closed to the blacks. They were banished to the gloomy forests and rain-whipped ranges on the coast.



A MOTOR ROAD AMONG THE FERNS

Under such unfair and unnatural restraint, they became all the more hostile, left the district to which the governor's proclamation had exiled them and resumed their work of massacre.

Another of Governor Arthur's plans for bringing a stop to the race was just as futile and ended even more disastrously. In an attempt to capture the natives individually and confine them by force in certain localities, he organized seven capture parties and offered a reward of five pounds for each adult and two pounds for each child taken. The majority of the black hunters were convicts, who found it far easier to kill their prey than take it alive.

#### Tasmanian "Drive" of 1830

In the face of two failures at pacification, Governor Arthur in 1830 undertook the famous Tasmanian "drive"—"the climax of the Black War and the most costly, picturesque and absurd incident in the relations of the two races." Ticket-of-leave men, convict servants and free settlers were linked in a human chain, 30 miles in length and extending from the east coast to the west, that dragged through forest, bush and marsh, across mountains and rivers, in an effort to drive the natives to Tasman's peninsula, a projection of barren land that would serve as a secure prison for the blacks

since only its narrow neck need be guarded.

There are 5,000 links in the chain of men. It was considered impenetrable. Fires, that stretched across the entire island, directed the march of the line. The campaign was expected to last 5 weeks and end with the sweeping of every black onto Tasman's peninsula.

When the peninsula was finally reached, after the island had been swept as with a colossal broom and over \$150,000 expended in the enterprise, only two captives, a man and a boy, were found in the net. The blacks had sifted through the lines and in the rear were again murdering defenseless women and children and firing houses.

The "great drive" was not without results, however. It proved that the natives who had terrorized the island were very few indeed. Months afterwards, Robinson, a religious brick-layer of Hobart, undertook the task of bringing in the natives by the powers of persuasion. After living with one tribe for several weeks and learning the

native language, he set out as official conciliator and unarmed and alone, accomplished what the 30-mile human chain had failed to do. A man of wonderful patience and Spartan courage, he gradually won the blacks over. He brought in his captives not in tribes but in fragments of tribes. The natives of Tasmania already were a vanishing race. The long feud with the merciless whites and disease had reduced their numbers amazingly.

#### Natives Are Banished

Once corralled, the natives were banished from Tasmania and transferred from neighboring island to neighboring island where they gradually died of rheumatism, consumption and grief. The race was gradually nearing extinction. With the death of Lalla Rookh in 1876, the native people of Tasmania were no more. They had vanished from this earth.

The Black War of Tasmania is one of the world's minor tragedies. It was a clash between unrestrained, heartless criminals and a handful of barbaric people, who were so simple that they were helpless in the defense of themselves, and the result, the total extinction of the black man, was inevitable.

Tales of convicts that turned bushrangers and became cannibals also form a gruesome chapter in the history of this picturesque island of the Pacific ocean.

# Knox Property Will Be Sold Soon

**Trustee for Springfield Concern Announces Auction—General Motor Stock Doubles in Value**

SPRINGFIELD, Mass., Feb. 20.—The entire property of the Knox Automobile Co., located in this city, will soon be sold either at private sale or public auction, according to an announcement made today by Chas. G. Gardner, trustee for the company. This company has been operating under bankruptcy for over a year, the receivership dating from January 21, 1913. The announced sale will include the factory in this city, together with all its machinery, fixtures, supplies, parts, completed cars, and those in process of construction. Offers for the whole or any part of the real estate or personal property will be considered and the buyer of the plant acquires the good will of the company and the use of the Knox name.

The trustee's statement, dated November 30, 1913, shows the following assets:

Real estate .....	\$ 298,012.49
Machinery and equipment.....	224,874.83
Agency equipment .....	5,000.00
Patterns and drawings.....	36,936.46
Merchandise inventory .....	859,337.78
Unexpired insurance .....	8,000.00
Accounts receivable (net).....	186,586.65
Cash .....	15,666.68
	 \$1,634,414.89

The valuation of the machinery and equipment was made by the American Appraisal Co., December 31, 1912. An analysis of the real estate shows a total valuation of \$323,803.41, a part of which is subject to mortgages aggregating \$36,900. The land is valued at \$78,550, buildings at \$237,145.31, and dwellings at \$8,108.10.

This property is located in the city of Springfield, Mass., adjoining railroad facilities, where it has the use of a spur track running the entire length of the side of the factory, or approximately 800 feet. The factory is located at the junction of Waltham avenue and Wilbraham road, which is a good residential and business section of the city, with trolley service passing the plant. The factory is a brick structure, with approximately 241,355 square feet of floor space, the buildings being approximating 300 by 115 feet in size.

In speaking of the announced sale, Trustee Gardner says:

"Since the company's bankruptcy, beginning with January 21, 1913, the gross business done amounts to \$1,250,242.41, and, considering general business conditions and the inevitable handicap of a concern operating under the direction of the court, this is a favorable showing. The past few weeks have shown an increase in the number of orders received and the outlook for future business is encouraging."

"The factory is equipped for the manufacture of motor vehicles, including the Knox-Martin tractor and various kinds of fire apparatus. Since the receiver took

hold fire apparatus to the value of \$269,400 and tractors to the value of \$392,250 have been sold.

## GENERAL MOTORS STOCK SOARS

New York, Feb. 23.—The spectacular rise in General Motors common stock, which has more than doubled in market value in 6 weeks has released a large crop of rumors. Early in January the stock was quoted at 37%. Last Thursday's high quotation of 75 $\frac{1}{4}$  represents an advance of 38% points, or more than 100 per cent.

It may be accepted as the policy of the present management to hew to the line until the 6% notes mature October 15, 1915, when there will be about \$8,000,000 coming due. The company can easily cut down this total and refund the balance into a long time bond without sinking fund provisions. It has been suggested that the company may call its 6% notes at 102 $\frac{1}{2}$ . Nothing of this sort is under consideration.

While there is no doubt that the conservative forces which have been shaping the General Motors Co. financial program have planned all along to wait until 1915 to begin common dividends, pressure is pretty certain to be exerted to force a small common dividend after the close of the current fiscal year, July 31 next.

At the rate current business is running it would not be at all surprising if General Motors net this year came very close to \$9,000,000, a balance of say 44 per cent or 45 per cent on the common stock.

The issues of preferred and common are both small, relatively speaking. The entire capitalization, including notes, is but a little over \$40,000,000 with which the company is doing a gross business of \$90,000,000.

## BRETZ BUYS DETROIT COMPANY

Detroit, Mich., Feb. 24.—Special telegram.—It became generally known here today that J. S. Bretz Co., New York, has purchased the controlling interest in the Massnick-Phipps Mfg. Co., of this city. The latter concern has long been established in this city and does contract machine work, principally the manufacture of motor car parts. The net worth of the concern is \$152,000 according to present rating. It employs about 100 men.

Although Walter Phipps still appears as president of the company, his interest has been absorbed entirely by Bretz, as has a portion of that formerly held by F. C. Massnick, secretary-treasurer and general manager.

No statement of the future policy of the concern has been made and it cannot be stated as to whether the Bretz contract

will tend to enlarge the scope of its manufactures. The concern is at present interested in the development of a cyclecar motor, and also manufactures the Lavigne steering gear.

## ALTER CAR ANNOUNCED IN DETROIT

Detroit, Feb. 21.—The Alter Motor Car Co. has been quietly in the process of formation in the storm center of the industry for some time, although its plans are just now coming to light. F. M. Woodard, sales manager of the new company, states that the concern has secured a 26-acre tract of land in the village of Plymouth, within 35 minutes of Detroit, and now is erecting a factory on the site for the purpose of producing cars in large quantities, under the trade name of Alter.

The Alter car, according to the advance specifications, is to sell for \$600 with equipment, electric starter and generator being \$85 extra. It has all the appearance of the medium-priced, semi-light weight car of today, and is equipped with a five-passenger body, on a 106-inch wheel base. The tread is standard, while the total weight of the car is 1,750 pounds.

The motor is a 3 $\frac{1}{4}$  by 4 $\frac{1}{2}$ -inch block type, of 22 horsepower. Cooling is to be by thermo-syphon. The gearset is a three-speed type, and the drive by shaft, axle reduction being 3 $\frac{1}{4}$  to 1. The frame and method of suspension are conventional. The rear axle is semi-floating, steering on the left and the gasoline tank is under the cowl.

The officers of the new concern are Guy Hamilton, president; C. A. Alter, vice-president; R. A. Skinner, secretary and general manager, and R. S. Todd, treasurer. The main offices of the concern are located in Detroit.

## TO BUILD 3,000 TWOMBLY CARS

New York, Feb. 24.—The Twombly Car Corp., of this city, has arranged contracts with the Driggs-Seabury Ordnance Corp., Sharon, Pa., to build 3,000 Twombly light cars which will retail at \$395. According to contract arrangements, demonstrating cars will be delivered on or about May 15, and beginning with June deliveries will be made at the rate of 500 to 600 per month.

The Twombly light car is a tandem seater, with 38-inch tread and 100-inch wheelbase. It is fitted with 28 by 2 $\frac{1}{2}$ -inch clincher tires and has 9-inch road clearance. Spring suspension is by using 30-inch semi-elliptics in front and 36-inch cantilevers in rear, these in conjunction with an underslung frame arrangement.

The front axle is an I-beam forging of chrome nickel steel and the rear axle is a live type with a solid shaft extending from wheel to wheel and with a differential at one end. The transmission is a three-speed friction with a two-speed planetary gear on the cross shaft carrying the friction wheel. From this shaft a single chain transmits to the rear axle, this arrangement giving six speeds forward and two

reverse. The motor is a four-cylinder, block type, water-cooled with thermosyphon circulation. It is rated at 15 horsepower, and is 2 $\frac{1}{2}$  by 4 inches bore and stroke.

The car is rated at a maximum speed of 50 miles per hour, is listed to weigh 600 pounds and has a claimed gasoline consumption of 40 miles per gallon.

#### CLINTON FIRESTONE DEAD

Columbus, O., Feb. 22—Clinton DeWitt Firestone, president of the Columbus Buggy Company of Columbus, O., since its organization in 1875, to the time it went into the hands of receivers in January, 1913, was found dead in bed at his apartments at the Vendome Hotel, today. The coroner pronounced it a case of apoplexy. He was apparently in the best of health and attended the theater the previous evening.

Mr. Firestone was born in Canton, Ohio, in 1848 and was educated at Beaver Falls, Pa., and Pittsburgh. He came to Columbus early in his life and was identified with the Iron Buggy Co. and the Buckeye Buggy Co. He was one of the organizers of the Columbus Buggy Co., which was located on North High street. After a reorganization the plant was removed to Dublin avenue.

Mr. Firestone was identified prominently with the business and social life of the Buckeye capital and was the first president of the Columbus Chamber of Commerce. He leaves a widow, two daughters and a son, in addition to a half brother, J. F. Firestone.

#### A. A. A. ATTACKED IN CONGRESS

Washington, D. C., Feb. 25—Special telegram—An attack on the American Automobile Association was made in the house of representatives yesterday by Congressman Shackleford. He claimed the A. A. A. maintained an "editorial canning factory" to promote the measures it favored; also that it maintained a "nefarious lobby" at the capitol and collected funds to fight the re-election of opponents of motor road bills. Immediate investigation of Shackleford's assertions was proposed by Congressman Borland in a resolution introduced after Shackleford finished his speech. The resolution calls for a committee of five to investigate what, if any, persons or associations have been engaged in maintaining a lobby with respect to roads. The committee would report to the house of representatives by June 1.

#### DID NOT SELL TO INTERNATIONAL

Racine, Wis., Feb. 24—Officers of the Mitchell-Lewis Wagon Co. deny the report that its wagon plant, which was sold last week, was purchased by interests identified with the International Harvester Co. The sale was made to White, Weld & Co. and associates, White, Weld & Co. being the principal owner.

## Patent Litigation Is Unusually Heavy

### Klaxon Gets Temporary Injunction Against Sperton Horn—Stromberg-Zenith SuitAppealed

NEW YORK, Feb. 20—Judge Chatfield in a very careful opinion has found the Hutchinson patents valid and that the Newtöne horn, which was involved in the case before him, viz., Lovell-McConnell Mfg. Co. vs. Automobile Supply Mfg. Co., infringes. The Sperton horn, used in this jurisdiction by the A. Elliott Ranney Co., on its Hudson cars, which is under consideration in this case, is even nearer the complainant's steam-actuated horns than was the Newtöne, according to the court's opinion, and the motion for a preliminary injunction has been granted.

The complainant brought motion for a preliminary injunction against the Hudson distributor January 27, alleging that the infringement consisted of the sale of Hudson cars equipped with the Sperton horn as well as the sale of horns separate from the car. It was alleged that the Hudson Motor Car Co. was party in interest insomuch as it furnished the defendant with the infringing articles and guaranteed the defense.

The Sparks-Withington Co., maker of the Sperton, was also alleged to be parties in interest because it furnished Sperton equipment to the Hudson Motor Car Co. and undertook the defense of the suit by paying the expenses and putting its own counsel in charge.

A motion for an interlocutory decree has been granted by Judge Hand in the United States district court for the southern district of New York, in the Lovell-McConnell suit against the Imperial Automobile Supply Co., National Automobile Supply Co., Thirty-Five Per cent Automobile Supply Co., American Auto Supply Co., Chas. E. Miller, and the Crane and Wagner Auto Supply Co. These companies are dealers in Newtöne horns.

#### SPRING REPAIRER LITIGATION

New York, Feb. 19—The Motor Car Equipment Co., sales agent for the Kantalever emergency spring repairer, and sole owner of the basic patent, has brought suit in the United States district court of the southern district of New York for an alleged infringement of patent No. 902,250, issued to D. P. Power, Oct. 27, 1908, by the Auto Surplus Stock Syndicate, a dealer in the spring repairer.

The Kantalever spring repairer is manufactured by the Electra Mfg. Co., of this city. This emergency repairer will hold intact any broken spring and carry any load without sacrificing the resiliency of the spring, it is claimed. It consists of a straight and a dropped plate which are placed above and below the damaged spring portion and are held there by means of two ankle brackets kept tight on the

plates by means of nuts engaging their threaded ends. The complainant alleges that the defendant's product looks and works like the Kantalever repairer, and asks for an injunction and costs.

#### APPEALS IN ZENITH-STROMBERG SUIT

Chicago, Feb. 25—John A. Bender Co., Chicago agent for the Keeton car, and defendant in the recent suit won by the Stromberg Motor Devices Co. for marketing cars equipped with Zenith carburetors, which was held to be an infringement of the Ahara patent owned by the plaintiff, has signified its intention of appealing the decision granted by Judge Sanborn in favor of the Stromberg company. The appeal will come before the circuit court of appeals at Chicago this spring.

#### CLOCK MAKER BRINGS SUIT

New York, Feb. 14—The Phinney-Walker Keyless Clock Co., of this city, has brought suit in the United States district court for the district of Connecticut against the New Haven Clock Co., claiming infringement of the Phinney-Walker patents on rim-wind motor car clocks.

#### CORRECTS CAR WEIGHT

Chicago, Feb. 24—In the gear ratio and car weight table in Motor Age, Feb. 12, the Cadillac weight was given as 2,950 pounds. This is a typographical error and according to the Chicago agent should be 3,950 pounds.

#### TAXI CONCERN IN \$10,000,000 DEAL

New York, Feb. 20—The Yellow Taxicab Co. and the Mason-Seamon Transportation Co., have decided to pool their interests and influence by combining. The combination will muster \$10,000,000 capital, it is said, and the company will fight for an increase in rates all along the line. It was positively denied that the combine will be a trust. It was said the Mason-Seamon and Yellow cars will number 1,200, and there are as many, if not more independent cars in New York.

#### CHARGED AS CONSPIRATOR

Kenosha, Wis., Feb. 23—In company with four Burns detectives, Jerry W. Decou, factory manager of the Thomas B. Jeffery Co., is charged with conspiracy and perjury in warrants sworn out here today by the attorney for George Kosak, who is on trial charged with bringing dynamite to Kenosha to blow up Decou's house. The complaint alleges that Decou and the detectives conspired to have Kosak convicted and that the latter gave perjured evidence against him.



## The Lesson of the Snows

THE snow-bound conditions, which have held several cities within their grasp during the past 10 days, have demonstrated more forcibly than words can tell the superiority of the motor truck as compared with horse-drawn vehicles under such circumstances, and although the truck has appeared to favorable advantage, the deep snow, nevertheless, has brought out one or two weaknesses in conjunction with the operation of motor trucks in daily service.

■ ■

THE snow has demonstrated that there are thousands of drivers incompetent to handle a motor truck when exigencies present themselves. These drivers are apparently competent to pilot a car through a city street over dry pavements, but hopelessly inadequate to handle it in snow. They do not possess the elementary knowledge of how to drive when the rear wheels begin spinning in the loose, powdery snow the same as in fine dry sand. Observations in four or five cities have shown that the driver continues to keep the rear wheels spinning when the truck fails to make headway. The longer they spin, the deeper they sink into the snow, and the more difficult becomes the job of extricating the truck and getting under headway. Spinning the wheels this way is the last thing that should be done. The moment forward movement stops, the driver should cease spinning the wheels. It is the same story as that of a touring car mired in mud or sand. By spinning the wheels, you only destroy tires and sink the car deeper.

■ ■

BUT in addition to making extrication more difficult by this foolish spinning of the rear wheels, the truck driver has been seriously damaging his tires. It may seem innocent sport to watch the rear wheels of a truck shod with dual solid tires spinning round in the snow without the truck making headway, but

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## Truth Will Out

TUTH invariably proves the strongest factor in the end. A good demonstration of this happened in connection with the recent traffic tie-up in several of our larger cities because of the snow. In an eastern city, one large manufacturer of electrics advertised exactly what happened to his different truck installations in the snow. Some of the installations had to be entirely withdrawn from the streets due to the machines running out of current. The batteries in these machines are adequate for regular use under normal traffic conditions but when streets are clogged with snow, then the battery capacity is not adequate to carry the same load at the same or lower speeds for the same distances.

■ ■

HEADS of concerns operating electrics apparently failed entirely to grasp this point. They imagined the silent battery would keep on for as many hours and for as many miles through the snow as over the hard streets. They soon discovered their error. It is as sensible to imagine that an electric can travel as far and carry as large a load in a given time through snow as it would on a hard street, as it is to imagine a man able to carry a 100-pound load on his back the same distance at the same speed through snow a foot deep as on a hard sidewalk. A moment's

many cases of tires coming loose on the base have been reported within the last 10 days because of this foolishness on the part of drivers. There are cases of new tires, with scarcely a chip of rubber lost from the tread and with few indications of wear, quite loosened at the base and practically destroyed by this absurd snow-driving.

■ ■

THESE snow difficulties suggest the necessity for anti-skid devices for use on trucks from 1-ton capacity up, fitted with dual solid tires. Observations show a remarkable lack of preparedness on the part of truck operators. Many of them have wrapped a few strands of rope around the tire and felloe at one or two points on the circumference. Others have fastened links of chains at two or three places, and not infrequently only one piece of chain will be seen on a tire. This irregular placing of chains or ropes makes a very hard drive and gives a most irregular or intermittent drive which is hard on the transmission mechanism of the truck.

■ ■

THERE is a wide field for different forms of anti-skid devices for vehicles of this type, which is a difficult field to cope with in that such devices are rarely needed except in such emergencies as snow and ice. Occasionally these are met with in our large cities a few times a year, but when needed are badly needed. There are, however, many cities where such devices are needed for several of the winter months.

■ ■

IT will prove a good investment to truck owners if they will more adequately prepare themselves for the exigencies of snow and ice. It will save them dollars and cents in tire wear alone to take time by the forelock and have their anti-skid equipment ready at a moment's notice to be installed.

■ ■

reflection will prove the point. Increased resistance means increased output, whether it be human or electric energy; whether it be manpower or kilowatts.

■ ■

THE sooner our truck operators realize the humanities of the motor equipment, the sooner will they get higher efficiency and more satisfaction from it. What should have been done with the electrics in the snow was to cut down the amount of load and keep the vehicles on the streets of greatest travel instead of getting into the side streets where, as observations show, the greatest tie-ups occurred. The railroad train, all types of horse vehicles, the trolley car, and other vehicles of locomotion are subject to delays when snow and ice impede their right-of-ways. Subject to delays when snow and ice impede their normal rights-of-way.

■ ■

THE electric truck and the gasoline truck are no exceptions to the rule. They are just as human when difficulties of this nature arise as the railroad locomotive, and the business man should recognize this. A few grains of precaution will prevent a tie-up and greatly conserve the truck and its tires.

# Open Season for Considering Motor Laws at Hand

## Legislatures of Nine States Have 114 Bills Pending—Many Freak Measures Introduced

**N**EW YORK, Feb. 24—There are nine state legislatures in session at the present time. Six convened the second week in January and three the third week. In the succeeding 5 weeks no less than thirty senate bills and eighty-four house bills were introduced affecting directly or indirectly the use of motor vehicles. This is a total of 114 legislative bills, most of which relate specifically to a single kind of road vehicle and are intended primarily to raise funds for road maintenance and to increase the safety of highway travel.

Classified by subjects, some of these bills are, in order of their numbers, as follows:

	Senate Bills	House Bills
Fixing registration fees...	10	18
Regulating speed and operation...	4	24
Regulating equipment...	2	11
Lights on all vehicles...	2	5
Requiring road signs...	..	3
Creating highway commissions...	1	3
State aid to roads...	1	2
Limiting truck weight and speed...	..	2
Licensing all drivers...	..	2
Limiting driving age...	1	1
Requiring wide tires...	1	1

The nine states in which the legislatures are in session, and the total number of motor vehicle and road bills introduced in each up to the middle of February, are: Massachusetts, 44 bills; New Jersey, 16; Kentucky, 13; Virginia, 12; New York, 10; South Carolina, 7; Maryland, 6; Rhode Island, 3, and Mississippi, 3.

### Double Taxation An Issue

The special nature of some of the bills is particularly interesting. In Mississippi there is a joint bill before both branches of the legislature providing for the refunding of license fees that were collected under the law which the supreme court of the state decided last year was unconstitutional because it imposed double taxation on the owners of cars, who paid personal property taxes on their machines. A decision along the same lines was handed down in Ohio last fall by one of the lower courts and has been sustained by a higher court. Test cases against the validity of the registration laws in Massachusetts, New Jersey and California have also been brought.

Because of this situation a bill has been introduced in New Jersey providing for the exemption of motor vehicles from personal property tax in order to clear the way for another bill almost doubling the license fees and requiring commercial vehicles weighing more than 4,000 pounds to pay an additional \$10.

Another Jersey bill would make it mandatory upon the driver to report to the police or other authorities any accident in which his car is involved. Another authorizes the exclusion of motor ve-

hicles from public parks, although the equal right of cars to the use of park roads was upheld in the courts of various states many years ago, in the relatively early history of motoring. Still other bills require payment of \$50 a week license for operation of a temporary garage, and attachment to all motor vehicles of a device that will scatter seventy-two metal markers in the street upon striking

any object with the front of the car, each marker having stamped in it the registration number of the machine.

The Kentucky senate has before it an act to prohibit owners who are doctors or dentists from taking out personal liability insurance, while Virginia has before the house two bills authorizing Accomac and Spotsylvania counties to levy special licenses on cars, in addition to a state registration fee, for the construction of roads in these counties.

A Massachusetts bill would make all motorists change their headlights or side lights so that those on one side of the car will show red and the opposite lights green, like a vessel.

Some of the legislators in New Jersey and Massachusetts would place the control of all street and highway traffic in those states in the hands of examiners and inspectors appointed by the commissioner of motor vehicles, and the highway commissioner respectively, with extraordinary and autocratic powers of revocation of driving licenses.

If 5 weeks can be productive of such a remarkable grist of bills, the total production before the close of the legislature next summer may rival the output of motor vehicles.

### S. A. E. PLANS EUROPEAN TRIP

New York, Feb. 20—A sailing date from New York of about October 10 has been set for the second European trip of the S. A. E. The first stop will be Paris, where a stay of 4 days is scheduled. During this stay the following plants undoubtedly will be available for inspection: Panhard, Renault, deDion, Clement, Peugeot, Delaunay-Bellville, Lemoine, etc. By night train the party will proceed from Paris to Turin, Italy. Between Turin and Milan 3 days are to be spent, visiting the Fiat, Isotta, Itala, Lancia, Züst and Bianchi factories. Lucerne, Switzerland, on the lake of the same name, is the next stop, with 36 hours given to sight-seeing trips.

From Lucerne to Schaffhausen at the Falls of the Rhine is a short trip, and here is located one of the best examples of electric steel foundries in Europe. Stuttgart, with the Mercedes-Daimler, Bosch and Eisemann plants, is the next point of interest, where a stop of 2 days is scheduled. The Krupp works will most likely be visited, including a trip down the Rhine. After this the Metallurgique and Minerva plants will be visited. A scheduled stop at London of 5 days' duration is next. The return voyage is from Liverpool, arriving in New York on or about November 18. The whole trip is of 39 days' duration and the cost about \$500.



### SHOWS, CONVENTIONS, ETC.

February 21-28—Newark, N. J., show.  
February 22-March 5—Cincinnati, O., show.  
February 23-28—Show, Danville, Ill.  
February 23-28—Omaha show.  
February 23-28—Indianapolis opening.  
March 2-4—Cincinnati commercial car show.  
March 2-7—Show, Utica, N. Y.  
March 2-7—Show, Sioux City, Ia.  
March 3-7—Show, Ft. Dodge, Ia.  
March 4-7—Show, Tiffin, O.  
March 5-7—Show, Elgin, Ill.  
March 7-14—Boston passenger car show.  
March 9-14—Show at Des Moines, Ia.  
March 17-21—Boston truck show.  
March 21-28—Maritime show, St. John, N. B.  
March 26-31—Show, Racine, Wis.  
April 12—Show, Palermo, Sicily.  
April 12-19—Austrian show.  
September 26-October 6—Berlin show.  
October 16-26—Paris show.  
November 6—Olympia show.

### CONTESTS

\*February 26—Vanderbilt cup race, Santa Monica, Cal.  
February 28—American grand prix, Santa Monica, Cal.  
March 1-25—Tour of France  
March 2-20—Army four-wheel drive tractors endurance tests, France.  
April 19-29—Coupe de Tourism, 1,000-mile cyclecar and light car endurance test around France.  
April 22—Track meet, Bakersfield, Cal.  
May 24-25—Targa Florio race.  
\*May 30—Indianapolis 500-mile race.  
May 30—New York track meet.  
May 30—Track meet, Providence, R. I.  
June 1—Florio cup race, Island of Sicily.  
June 6-7—Track meet, St. Louis, Mo.  
June 10-11—Isle of Man road races, Great Britain.  
June 17-18—Hill climb, Uniontown, Pa.  
June 30—Track meet, Sioux City, Ia.  
July 3-4—Road races, Tacoma, Wash.  
July 4—French grand prix, Lyons.  
\*July 4—Three hundred mile race, Sioux City, Ia., speedway.  
July 4—Track meet, Providence, R. I.  
July 17-18—Speedway races, Seattle, Wash.  
July 25-26—Belgium grand prix road races.  
July 26—Le Mans cyclecar grand prix race.  
July and August—French army truck subsidiary trials.  
August 2-9—Six day cyclecar reliability in French Alps.  
August 28-29—Road races, Elgin, Ill.  
September 5—Track meet, Milwaukee, Wis.  
September 6-7—Italian grand prix.  
September 7—Track meet, Providence, R. I.  
September 9—Speedway races, Pomona, Cal.  
September 9—Road race, Corona Beach, Cal.  
October—Kerosene motor tests, Paris.  
October—Gallion hill climb, Paris.  
October 2-3—Track meet, Oklahoma City, Okla.  
October 2-3—Track meet, Trenton, N. J.  
November 8-11—Track meet, Shreveport, La.  
November—El Paso-Phoenix road race.  
\*Sanctioned by A. A. A.

# Floods Cause Postponement of Santa Monica Races

Vanderbilt Cup Contest to Be Run To-day and Grand Prize Saturday,  
According to New Schedule



STRAIGHTAWAY ON BACK STRETCH OF SANTA MONICA COURSE

**By C. G. Sinsabaugh**

**L**OS ANGELES, Feb. 21—Special telegram—Unusual weather conditions for this vicinity—heavy rains followed by washouts—resulted in the postponement of the Santa Monica road races, scheduled to be run today and Monday, the Vanderbilt cup event being put over to next Thursday and the struggle for the grand prize rebooked for Saturday, February 28.

There has been no letup to the rains, which started their work of inundation Tuesday, so Chairman Shettler of the contest board of the Western Automobile Association and manager of the speed carnival called a meeting of the drivers this morning when it was decided to take a chance on the proverbial silver lining that the darkest clouds have and to postpone the meet until next week.

#### Stutz and Mercer File Objections

It was first planned to hold the grand prize on Monday and the Vanderbilt cup race on the following Wednesday but the Stutz and Mercer people objected to such an arrangement as they are after Vanderbilt cup honors and did not wish to take any chances with their cars by starting them first in the grand prize. This objection sounded logical to Shettler so the schedule as outlined above was decided upon.

It would have been possible to have started the races today but it would have meant a comparatively small attendance. The managers of the trolley lines and railroads declare that the storm has tied up traffic to such an extent that they would be unable to handle the crowds. Out of

UPPER ILLUSTRATION: TURN AT SOLDIER'S HOME. LOWER ILLUSTRATION: RICHEN-BACHER ROUNDING NEVADA AVENUE CORNER

town attendance would have suffered had the races been run as originally scheduled, for at the present time the residents of Los Angeles practically are marooned and cut off from the outside world. There are no trains running in or out of the city and this condition may prevail for two days or more. Moreover there are certain stretches of the magnificent course that have been affected by the extreme weather conditions.

The advance sale of seats runs into the thousands and is a record-breaker for a Pacific coast speed meet. The Western Automobile Association could run a meet successfully with the money already taken in from advance sales.

#### Drivers Welcome Postponement

The drivers welcome the postponement for they want more practise. Ralph de Palma has only been out once and several of the other pilots have had little time to tune up their cars and learn the course.

It looks now as if all the cars would go to the tape in both races with the exception of the French Delage. A veil of mystery surrounds this entry. It has not

arrived as yet and no one seems to know whether it is in this country or not. One story has been published in the local papers to the effect the Omer Toft, displaced as the Delage driver at the eleventh hour by Bert Dingley, had stopped the car in New York because he was not going to be at the wheel of the importation from France. It is intimated by Oldfield and his backer, George Settle, that Toft never went to France to get the car and they offer a reward of \$100 for proof that the purchase was made.

#### Dave Lewis to Drive

Los Angeles, Cal., Feb. 23—Special telegram—If communication with the outside world had been possible, both the Vanderbilt cup and grand prize road races could have been run on the dates originally scheduled, Saturday and today. Since late Friday night the skies have been comparatively clear but the havoc of the storm was such that the meet would have been a fizzle from a box office viewpoint.

As it is now Los Angeles has received no mail from the outside world since last Thursday, but communication is opening

up and things will be normal by Thursday when the Vanderbilt cup race will be run. There is only one disturbing factor. The weather man forecasts more rain the latter part of this week.

Practice was resumed this morning and the course shows little damage from the storms. Wishart and Pullen, the Mercer drivers, and Tetzlaff, in the big Fiat, went around at a speed of 87 miles an hour, while Anderson and Cooper of the Stutz team, traveled almost as fast.

Dave Lewis has recovered completely from his accident of last week and has decided to drive in both races. He will be at the wheel of a Mason Thursday and will make his dash for the grand prize in a Fiat. Carlson and the Mason have been substituted for the Delage in the grand prize. A veil of mystery still surrounds the whereabouts of the Delage and Bert Dingley, who was to drive it, is disappointed that he cannot be a come-back.

Bidding for the 1915 classics has already started. J. B. Ryall, a former race driver, is here from San Francisco to secure the Vanderbilt cup event for that city next year. He claims that he can get the Golden Gate Park course for the event which would be made a feature of the Panama-Pacific exposition. If he fails to secure the Vanderbilt cup sanction, he may try to get young Vincent Astor to put up the Astor cup for a Panama-Pacific exposition road race. George W. Browne of Milwaukee, one of the promoters of the 1912 grand prize and Vanderbilt cup races, is here in hopes of landing the two classics from the Cream City in 1915. Brown claims that the Badgers have learned how to promote road races from their rather costly experience in 1912, and that a revival of the events in Milwaukee would be crowned with success.

#### Perfect Course for Speed

Los Angeles, Cal., Feb. 20.—To the easterner—it sounds peculiar to apply this term to us of the middle west—the Santa Monica course is a revelation. Perhaps

the Indianapolis speedway has the edge on this California course because of its universal smoothness, but that edge is not much, for the Santa Monica course is faster than the Hoosier oval, as has been proved in the past. This is accounted for by the long straights and the easy turns, which permit of sensational speed. The possibilities for Saturday and Monday cannot be measured, but it is certain that Indianapolis never can cope with the local circuit. It was on this course that the late David Bruce-Brown showed one lap at the rate of 93 miles an hour, and that was 2 years ago. Now, with faster cars and tires that can stand the gaff better, there seems to be no reason why 80 miles should not be easily beaten in this year's classics. It would not be surprising if even 80 were beaten.

Santa Monica is most accessible to Los Angeles. It is only 16 miles away and the roads there by motor cars are boulevards, while the trolley-riding public is given every facility. In a way the circuit reminds one of Elgin in shape, but the surface is immeasurably better. Here the road is like a boulevard all the way, while at Elgin there is a waviness on the back-stretch that slows the speed. Elgin's turns seem as easy to negotiate as Santa Monica's, but the surface gives California the edge. Elgin never can hope to cope with the local course until the long-cherished dream of a cement course is realized.

#### Course in Heart of Town

Elgin's finishing straight, to a Chicagoan, seems better than Santa Monica's, for it is more like one imagines a road race should be—out in the country, with green fields everywhere and no signs of a city. At Santa Monica one cannot get away from the city. One feels as if he were standing alongside of a city boulevard watching the cars speed by, while at Elgin one is near to Nature's heart. Still sacrifices must be made to the gods of speed, hence Santa Monica's wonderful popularity. From this viewpoint, certainly

no course in the world can compare with the California circuit.

The finish at Santa Monica this year has been bettered by moving it nearer the Ocean avenue turn. It cuts down the speed of the cars to a certain extent, for the drivers do not have a chance to recover from the turn before they are crowding the tape. But the change is for the better at that. The big stands are not covered because out here we do not have the hot sun we find at Elgin, while from the broad Pacific just across the road come cooling breezes that nullify the glare of whatever sun there is. One can throw a stone from the stand into the ocean—provided he is a good thrower.

#### Co-operation for Promoters

Santa Monica is lucky in having back of the enterprise the local chamber of commerce which brings to the assistance of Leon T. Shettler, chairman of the racing committee of the Western Automobile Association, a crowd of enthusiastic citizens who leave no stone unturned to make the race a success. They realize the benefits of the races and they back Shettler up in everything. When the chairman went to New York last month to get his sanction he had not finally closed with the Santa Monica officials and he was taking a chance in paying over his sanction money. It was not much of a chance, at that, but Shettler was cautious enough to have an ace in the hole. Before he went, he and Bert Dingley looked around and found at least three other courses within easy distance of Los Angeles which are said to be better than Santa Monica. One of these could have been used if necessary, but when Shettler came back and reported that all the red tape had been cut Santa Monica "came across" and all the details were clinched.

In addition to having the finest course in the world, Santa Monica also has a scoring system that cannot be beaten. This system does not pretend to have anything to do with the time that is being made.

SPECIFICATIONS AND EQUIPMENT OF CARS ENTERED IN VANDERBILT CUP AND GRAND PRIZE ROAD RACES

Car and Driver	No. Cyl.	Bore and Stroke	Piston Dis.	Wt.	Gear Ratio	Final Drive	Magneto	Spark Plugs	Carburetor	Tires
Fiat, Tetzlaff.....	4	6 x 8	904	3250	.....	Chain	Bosch	Bosch	Master	Savage
Isotta, Grant.....	4	4 3/4 x 6 1/3	449	2600	2 1/2 to 1	Chain	Bosch	Bosch	Zenith	Palmer Cord
Mercer, Wishart.....	4	4 3/4 x 6 1/3	445	3000	2 1/2 to 1	Bevel	Bosch	Bosch	Rayfield	Palmer Cord
Stutz, Anderson.....	4	4 1/2 x 6	436	2450	2 to 1	Shaft	Bosch	Bosch	Schebler	Braender
Mercer, Pullen.....	4	4 1/2 x 6 1/2	445	3000	2 1/2 to 1	Bevel	Bosch	Bosch	Rayfield	Palmer Cord
Delage, Dingley.....										
Mason, Rickenbacher.....	4	4 5/8 x 6	350	2000	2 1/4 to 1	Shaft	Bosch	Bosch	Schebler	Miller
Alco, Taylor.....	6	4 3/4 x 5 1/2	450	.....	2 1/2 to 1	Shaft	Bosch	Bosch	Master	Miller
Mercer, Oldfield.....	4	4 1/2 x 6 1/2	445	3000	2 1/4 to 1	Bevel	Bosch	Bosch	Rayfield	Firestone
Stutz, Cooper.....	4	4 1/2 x 6	436	2450	2 to 1	Shaft	Bosch	Bosch	Schebler	Braender
Fiat, Verbeck.....	4	5 1/8 x 6 1/8	567	2850	2 to 1	Chain	Bosch	Bosch	Master	Batavia
Mercer, Gordon.....	4	4 1/2 x 6	300.7	2300	2 1/4 to 1	Bevel	Bosch	Bosch	Master	Goodyear
Mason, Carlson.....	4	4 5/8 x 6	350	2000	2 1/4 to 1	Shaft	Bosch	Bosch	Schebler	Miller
Apperson, Goode.....	4	5 1/4 x 5	519.4	2750	.....	Chain	Bosch	Bosch	Master	Kelly-Springfield
Mercedes, de Palma.....	4	5 1/2 x 6 1/2	598	2800	2 to 1	Chain	Bosch	Bosch	.....	.....
Sunbeam, Marquis.....	6	3 1/2 x 6 1/2	299	2250	2 3/4 to 1	Shaft	Bosch	Bosch	Claudel	Palmer Cord
Marmon, Ball.....	4	4 1/2 x 7	496.2	2900	2 3/4 to 1	Shaft	Bosch	Bosch	Master	.....
Alco, Janette.....	6	4 1/2 x 5 1/2	548	3325	2 to 1	Chain	Bosch	Bosch	Rayfield	Miller
Marmon, Muth.....	4	4 1/2 x 5	318.1	2800	2 3/4 to 1	Shaft	Bosch	Bosch	Master	Miller
Touraine, Joermann.....	6	4 x 5 3/4	433.5	2650	2 1/4 to 1	Shaft	Bosch	Bosch	.....	Miller

That is a by-product for the announcers, but on the big bulletin board that faces the grand stand one can watch every move that is being made in the battle of speed. At every mile post the progress of the cars is noted and reproduced on the board. This is so interesting that in previous races it is said that the score board has brought cheers from the crowd even when no cars have been in sight.

#### Easy to Follow Race

The idea was conceived by E. H. Pendleton, of Venice, Cal., who this year, in addition to handling the score board, will operate the Stewart-Warner timer. The Pendleton system is the outcome of 5 years of study and experimenting at Santa Monica, undertaken for the purpose of keeping the spectators continually advised of the exact positions of the racers. Those occupying grand stand seats for the average race only see the cars for a fraction of a minute as they pass, and unless the course is a speedway where the cars always are in sight there is a long wait. About 90 per cent of the time the crowd is

in ignorance of the cars' relative positions.

But with the Pendleton system it is different. The standing of the race is given by a system of telephones and operators stationed at intervals around the entire course. These operators report to the operators on the switchboard, who in turn move a slide to the position on the board corresponding to the car's location on the course.

The Santa Monica course is 8.4 miles in length and there is a telephone and operator at each mile. There are eight positions corresponding to those shown on the score board. Each car is represented by a slide that contains its number, and this moves across the board. At the end of the slot is a set of numbers representing laps. These are changed each time the cars have completed a lap. There are sixty-five stations divided as follows: ten reporting stations, ten police, five hospital, eight press, three judges and timers, five private boxes, fifteen pits for racers, five private lines and the balance telegraph lines.

drive the Centipede in all the races in which he competes during the coming season. Burman will make his 1914 premiere at the Indianapolis speedway. He then plans to drive in the 300-mile race at Sioux City, go to the Pacific coast to compete at Seattle and Tacoma and return to Chicago in time for the annual Elgin meet.

#### DIRT TRACK RACES START SOON

Racine, Wis., Feb. 23—The first dirt track meet of the impending season will be held at Hot Springs, Ark., March 9, when the members of the Case racing team will make their 1914 premiere. The Case crew will leave the local factory Wednesday for the Arkansas spa. Manager Sloan has five drivers under contract—Louis Disbrow, tamer of the Jay-Eye-See; John Raimey, former Cino pilot; Lou Heinemann, once a member of the Marmon team; Eddie Hearne, Chicago's favorite son on the gasoline circuit, and Heine Ulbrecht.

"Farmer Bill" Endicott, who campaigned with Sloan last year, will be among the missing when the drivers check out of Racine. It is reported that Endicott has hooked up with Ernie Moross and will drive one of the Maxwell cars that Ray Harroun is building for the 500-mile race and a season of extensive barnstorming.

The 1914 Case fleet will consist of six cars—three bearing the Case nameplate, the Simplex, the Jay-Eye-See and a hybrid creation. Two of the Case cars were built during the winter especially for dirt track racing. They are extremely narrow, one measuring but 14 inches and the other 22 inches at the widest part.

#### MERCEDES FOR 500-MILE RACE

Los Angeles, Cal., Feb. 21—Special telegram—Ralph de Palma this morning received a telegram from Paul Lecroix, informing him that the Mercedes company is sending over a six-cylinder car—one of those that ran in the last French grand prix—for the Italian to drive in the 500-mile race at the Indianapolis speedway Memorial day. De Palma is slated to drive one of the Mercedes entries in the French grand prix to be run July 4.

#### 500-MILE RACE NUMBERS ALLOTTED

Indianapolis, Ind., Feb. 23—with eleven formal entries already in, the management of the Indianapolis speedway has assigned the following numbers for the annual 500-mile race to be run Memorial day:

No.	Car	Driver
1	Burman . . . . .	Burman
2	Stutz . . . . .	Cooper
3	Stutz . . . . .	Anderson
4	Grav Fox . . . . .	Wilcox
5	Bullet . . . . .	Keene
6	Peugeot . . . . .	Goux
7	Peugeot . . . . .	Boillot
9	Sunbeam . . . . .	Chassagne
10	Delage . . . . .	Guyot
12	Excelsior . . . . .	Christiaens
17	Burman . . . . .	No name

No. 8 has not been given out yet, being reserved for one of the Maxwell cars.

## May Revive Fairmount Park Race

### Philadelphia Councils Ask Commission to Grant Permit for Former Classic

PHILADELPHIA, Pa., Feb. 21—After lying dormant for some time, the proposition to revive the Fairmount park road race was stirred into activity this week by the Quaker City Motor Club.

Both common and select councils passed without a dissenting vote a resolution requesting the Fairmount park commission to grant the Quaker City Motor Club permission to conduct a 200-mile motor car race in the park next fall. While the city councils have no jurisdiction over the park commissioners, their unanimous approval of the proposition is expected to carry some weight with the commissioners in getting them to reconsider their determination to no longer permit racing in the park.

It will be remembered that, in spite of the fact that the race was stopped because of alleged danger, for 4 years they were conducted without a single fatal accident. It was conclusively proven that with the Quaker City Motor Club officials working in conjunction with the municipal authorities, danger of serious accidents was reduced to a minimum.

Councils at their meeting on Thursday took the attitude that these races had been a source of enjoyment to a large proportion of Philadelphians and visitors and ought to be resumed in 1914.

Several attempts have been made to get the Fairmont park commission to rescind its ruling, but they have so far been unsuccessful. However, it is believed that it is only a question of time before permission will again be granted.

#### BURMAN NO LONGER BARNSTORMER

Chicago, Ill., Feb. 21—Bob Burman has forsaken the paths of the barnstormers and during the coming season the holder of the American straightaway mile record of 25.4 seconds will compete only in the more prominent races and speedway meets, such as are scheduled to be held at Indianapolis, Sioux City, Tacoma, Seattle and Elgin.

This is the announcement of Alex Sloan, manager of the Case racing team and a former manager of Burman, who today agreed to act as Wild Bob's business adviser during 1914. Up until today Burman was a free lance. At the close of last season he broke off relations with Ernie Moross, who had chaperoned him in his dirt track migrations for 2 years, and late in the fall agreed to assist Horace Thompson of Battle Creek, Mich., in building two Centipede cars, entered in the 500-mile race, one of which Burman is to drive in the Memorial day classic.

According to present plans, Burman will

# Case Company Issues \$12,000,000 in Gold Bonds

## Racine Concern to Reduce Its Current Loans—Drop in Price of Crude Rubber Causes Goodrich Deficit

**R**ACINE, Wis., Feb. 20—Special telegram—The J. I. Case Threshing Machine Co., maker of Case motor cars, has sold to a syndicate, headed by the First Trust and Savings Bank of Chicago and Potter Choate and Prentice of New York, an issue of \$12,000,000 first mortgage 6 per cent serial gold bonds, maturing at the rate of \$1,000,000 annually from December 1, 1914, to December 1, 1926.

The company's preferred stock this week dropped from 93 to 82 and the announcement of the bond issue is taken as the reason for the recent weakness.

In 1911, the Case company sold \$8,000,000 preferred stock for the purpose of cancelling \$2,300,000 worth of bonds on May 1, 1912, to provide \$1,200,000 for plant extensions and to liquidate bills payable.

President F. K. Bull has issued the following statement concerning the company's position after giving effect to the new bonds:

"The profits of the Case company are largely in excess of the amount required to pay the interest on these bonds and the dividends on the preferred stock. Its quick assets will now exceed the entire amount of its obligations, including the bonds now issued, and also the entire par value of its preferred stock outstanding. The volume of its accepted business since January 1 is larger than for a similar period in any preceding year.

"The annual payments of the bonds can readily be effected without interfering with its preferred stock dividend, which stock will be in a much safer position than when the company was obliged to borrow on short term obligations amounts of money at all times of the year.

### Financial Independence Sought

"The company, through the sale of the bonds, will practically fund the company's current obligations and place it in a position so that after the year's product is sold the company should have no current obligations and a large cash balance, and it will also insure its financial independence for a long period.

"The bonds are issued for the sole purpose of reducing the current loans of the company, and every dollar received from the proceeds of the bonds will be used for that purpose.

"The recession in business for the last quarter of the year 1913 compelled the company to carry over a larger amount of material and product than necessary, which will be reduced during the coming year, so that outside of its earnings from manufactures it will be enabled to pay the first installment of the bonds through liquidation of inventory, and except for a few months during the height of its manu-

facturing season the company will be free from current borrowing.

"The net manufacturing cost of the company's product will be materially reduced through the operation of its large new foundry and machine shop now completed, which includes a new power plant of ample capacity and economical operation, all on ground owned by the company at Racine. This investment will enable the company to withdraw from the purchase of castings from outside sources."

The J. I. Case Co. has an authorized capitalization of \$20,000,000 each of preferred and common stocks, there being at present \$12,150,000 of the former and \$8,300,000 of the latter issues outstanding. The senior issue is cumulative and pays 7 per cent dividends.

### GOODRICH REPORTS DEFICIT

Akron, O., Feb. 23—Because the directors of the company were not prophets and failed to foresee a reduction in the price of crude rubber and strike clouds on the horizon, the B. F. Goodrich Co. closed the year of 1913 with a deficit of \$100,253 on its books, according to the annual report covering operations for the year ending December 31 last, issued yesterday.

Early in the year, before the price of crude rubber was cut and the employees went out on a strike, a quarterly dividend, amounting to \$600,000, or 1 per cent, was paid on the common stock. This was paid on February 15 and resulted in a deficit of \$100,000.

Meanwhile the full dividend of 7 per cent on the preferred stock was earned with a surplus on that account of nearly \$500,000. The income account and balance sheet follow:

	Dec. 31, 1913.	Dec. 31, 1912.
Net sales.....	\$39,509,346	\$37,533,861
Mfg., selling exp.....	36,459,233	33,814,527
Profit from operation.....	\$ 3,058,112	\$ 3,719,334
Miscellaneous inc.....	491,316	571,845
Total net income.....	\$ 3,549,428	\$ 4,291,179
Prov. for depreciation.....	541,358	440,852
Int. on bills payable.....	239,906	327,838
Reduction of treas. pfd. st. from cash to par value .....	168,417	.....
Net profit .....	\$ 2,599,747	\$ 3,522,489
Preferred div., 7 pct..	2,100,000	*1,575,000
Surplus for com.....	\$ 499,747	\$ 1,947,489
Paid on common.....	600,000	1,200,000
Surplus for yr. [def.].....	\$ 100,253	\$ 747,489

\*5 1/4 per cent. ↑2 per cent.

But one dividend was paid on the common stock, disbursements being discounted after February. In his report to the shareholders, President B. G. Work pointed out that at the beginning of the year the price of plantation rubber was over \$1 a pound. At the end of the year it was

about 55 cents a pound. The company carried a large inventory of crude and manufactured rubber and the decline in the market for raw material caused a much smaller margin of profit on the goods manufactured from high priced rubber than would have been shown on the same volume of business in a normal market. The company also experienced labor troubles.

### President Issues Statement

Concerning items in the balance sheet, President Work says:

"In compiling the balance sheet and profit and loss account accompanying this report, several changes have been made which warrant comment. The 20,587 shares of preferred stock of the company held in the treasury have been written down \$168,417.03, which amount is shown separately in the profit and loss account.

"A decrease of \$3,611,712.96 in merchandise inventory is due to decreased cost of crude rubber and decreased price of finished product and goods in process of manufacture. It does not reflect any marked change in the volume of material or goods on hand. The reduction of \$4,173,904.78 in current liabilities measures both the progress of the company in respect to financial strength and the decrease in borrowed money as a result of lower prices."

Apparently, no financing is deemed necessary, for Mr. Work, after reviewing the company's position, says:

"This condition, coupled with the strong position of the company in respect to working capital, would indicate that the necessity for new financing is very remote, either for plant or for working capital."

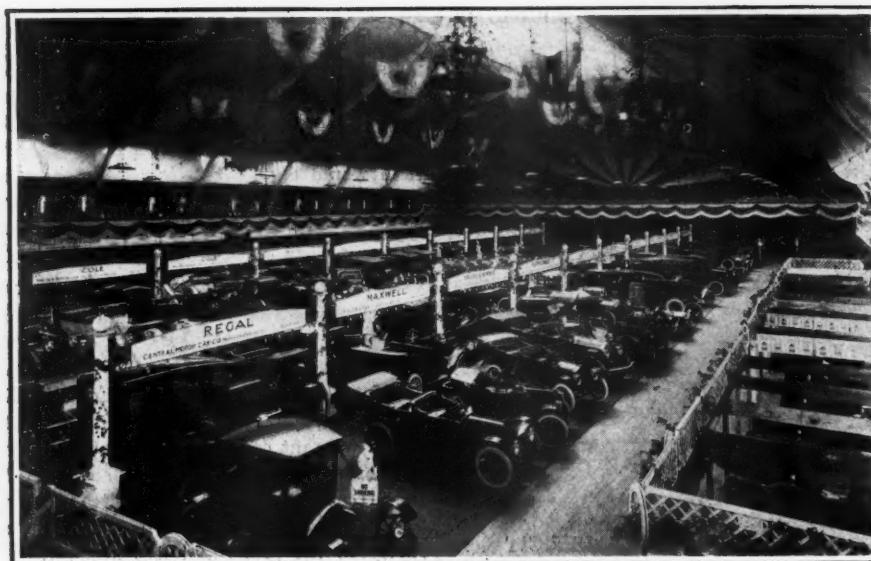
### BUICK ISSUES STATEMENT

Flint, Mich., Feb. 20—The Buick Motor Co. increased its assets in 1913 by approximately \$4,000,000, according to a financial statement for the fiscal year ending October 31, 1913, recently issued. The statement shows the following assets and liabilities:

	ASSETS	LIABILITIES
Real estate branches.....	1913	1912
Machinery, branches.....	72,284	.....
Material stock in progress.....	51,669	.....
Branch furniture.....	5,638,927	4,283,600
Cash.....	\$2,936,538	61,984
Debts receivable .....	1,517,413	.....
Totals .....	4,453,951	2,767,706
Investments .....	516,400	3,041,084
Other assets .....	4,270,321	1,014,213
Totals .....	<u>\$15,065,536</u>	<u>\$11,106,604</u>

# Prosperity Indicated by Exhibits and Sales at Minor Shows

Pleasure and Commercial Cars Displayed in Newark This Week—Winnipeg's Motor Carnival



AN AISLE IN NEWARK'S EXHIBITION HALL

**N**EWARK, N. J., Feb. 21—Greater in size than any of its predecessors, Newark's seventh annual motor show opened in the First Regiment Armory tonight. More than forty different makes of passenger cars, nineteen makes of commercial vehicles and fifty-eight accessory exhibits are on display. There are twenty-seven passenger car exhibitors and thirteen commercial car exhibitors. The estimated aggregate value of the exhibits has been placed at \$1,000,000.

Jerseymen have always been fortunate in the fact that the shows held in this city have combined in the one exhibit not only all of the leading pleasure cars, but the principal makes of business vehicles as well. As a matter of fact, the Newark show takes rank with the national exhibits which are held annually in New York and Chicago in so far as variety of exhibits is concerned. Many of the costly exhibits that were specially prepared for the big national shows are shown in Newark in their entirety.

#### Cyclecars Are on Display

There are cars to meet every purse, from a runabout selling at \$395 to the closed cars selling at \$6,000 each. Several different makes of cyclecars are on exhibit, including the Imp, Mercury and Economy. With Jersey's famous highways a large business should be developed for these little cars.

Last year there were 107 exhibitors. There were seventy-three different makes of pleasure cars and fifty-eight makes of commercial cars. The estimated total value of exhibits was \$750,000.

The New Jersey Automobile Exhibition

Co., under whose management the show is held, states that there were nearly 5,000 people at the opening. Gold and white predominate in the decorative scheme. More than 40,000 yards of blue bunting hide the girders and the floor is covered by a maroon carpet.

#### Newark State Sales Center

This city is the motor car trade center for the state. There are seventy-nine dealers, representing practically every American car and a number of the important foreign cars. There is an immense field for the commercial vehicle in this city. At the beginning of this year, over 400 commercial cars and more than 5,200 passenger vehicles were registered for 1914. This city ranks with the other large motor truck manufacturing cities, having nine flourishing commercial vehicle factories. Over 200 accessory factories are doing a large business in Newark, including the Lovell-McConnell Mfg. Co., Splitdorf Electrical Co., and the Hyatt bearing concern. There are seventy-three garages, seven repair houses and eleven supply houses.

The manufacturers in Newark say that business is good and the prospects are bright. In the Splitdorf Electrical Co.'s plant a full force of 1,000 men are being kept at work and business is normal. The Riley-Klotz Co., maker of accessories, states that orders are coming in steadily and a brisk trade revival this spring is certain. Some of the concerns state that a conservative estimate on the total business for the year will exceed that of the previous year by from 20 to 25 per cent. A forward movement in trade has set in and the heads of many and varied industries

in and near Newark are very optimistic.

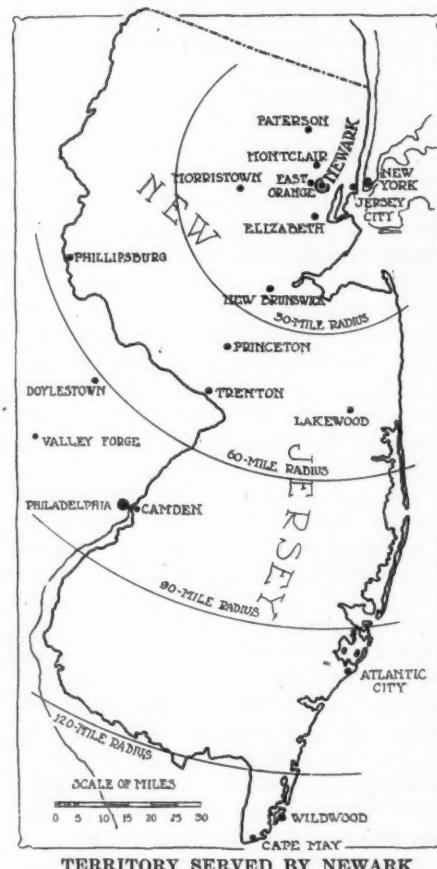
A majority of the dealers state that their Newark agencies cover practically the whole state, including nearly 8,500 square miles. A few have sub-agencies established, but most of the business comes through the Newark offices.

The car selling under \$2,000 seems to be the most popular in point of sales.

#### Industries Use Trucks

The big industries of Newark are leather and varnish making. For the state the textile industries taken together are the most important of the manufacturing industries. The fisheries of the state are of great commercial value. In these and allied industries, the commercial vehicle is being used in preference to the old horse-drawn vehicle. In Newark especially, where there are many long hills, these vehicles do Trojan work.

The roads of New Jersey are always in good condition, over \$500,000 being spent annually in repair or construction. The Newark turnpike, for instance, offers the manufacturer opportunity for the transportation of his products from that city to New York. The Plank road is another example. Instead of loading his wares on freight trains, as was formerly done, the manufacturer is gradually adopting the



motor truck as a better means of transportation, within a radius of 100 miles. This state abounds in beautiful scenery, as well as good roads, a wonderful combination. The total mileage of public roads is close to 90,000, of which nearly 5,000 is macadam, and nearly 10,000 miles are gravel.

New Jersey has assumed a prominent place in motor car manufacturing and allied trades. Over 40,000 men are employed in such industries in this state, in addition to which there are upwards of 1,000 garages, with more than 7,000 employes and 14,000 chauffeurs. Such concerns as the International Motors in Plainfield, Mercer in Trenton, Simplex in New Brunswick, Torbenson Motorcycle Co. in Bloomfield, and the Vanderwater Co., in Elizabeth, are doing a thriving business. There are twelve tire manufacturing concerns in this state. Seven of these are located in Trenton, including the Acme, Ajax-Grieb, Empire, Home, Thermoid and the United and Globe tire manufacturing companies. The Michelin company is in Milltown, near Trenton. The Rutherford and the Braender tire companies are in Rutherford, while the Carspring Tire Co. is in Jersey City. The Mattson Rubber Co. is in Lodi, while the Hardman company is in Bellville, near Newark. Bloomfield, though a small town, boasts of a tire company called the Combination Mfg. Co. The Sims magneto plant is practically in this city, being on the division line of East Orange and that city. Such large concerns as the Hartford Suspension Co. and the Dixon Graphite Co., are in Jersey City. The big Edison plant is in Orange, near Newark. The Spicer Mfg. Co., manufacturer of universal joints, is in Plainfield. The Holly Motor Co., Mt. Holly, is another concern doing a splendid manufacturing business in this state.

#### WINNIPEG'S CARNIVAL WEEK

Winnipeg, Feb. 20, 1914.—The carnival week promoted by the Winnipeg Motor Trades' Association proved a great success as a means of replacing the annual motor show, which had to be abandoned this year for want of a suitable building in which to accommodate it. The great features of the week were the two big parades, one taking place on Tuesday and the other on Thursday carrying displays made by tire concerns and accessory dealers.

Attendance of visitors from country points was fully up to the previous year's standard and many sales have been made during the progress of the carnival. All the dealers' show rooms were beautifully decorated and a special silver trophy, offered by the association for the best decorated show room, was won by the Russell Motor Car Co., of the Russell-Knight car.

## Cincinnati Scene of Motor Display

### Legal Fight among Dealers Does Not Affect Success of 1914 Exhibition

CINCINNATI, O., Feb. 23.—The fourth annual show of the Cincinnati Automobile Dealers' Association was thrown open to the public Saturday evening, February 21. The exhibition is being held in the north wing of Music Hall and will run until March 4. The last 3 days are to be taken up in the exploitations of the new model trucks.

Always successful in the past, the dealers have great hopes for this display. They expect it to attract a larger average attendance than last year, when a record was set, and this despite the fact that a rival exhibition just came to a close 1 week ago. Thirty-one different types of pleasure cars are displayed. Of these only five are electrics. About 200 machines are on the floors and they range from the \$7,500 limousine to the \$395 cyclecar. Both floors of the north wing of the big hall are used. The first floor has a space of 17,700 square feet and the top floor 14,900 square feet.

#### Dealers' Association Splits

This year there occurred a split in the ranks of the Cincinnati Dealers' Association. Those members who were outlawed some months ago held a show of their own in the Union Central skyscraper. This display came to a close February 14 and was marked as a successful one.

The men back of it called themselves the Cincinnati Automobile Trade Association. They quit the Dealers' Association because of some differences as to when dues should be paid. The exhibition they held was attended by fairly large crowds, but many of the standard makes of cars were missing.

According to a rule laid down by the Dealers' association any member who took part in the show of the trade association became barred from the present big display. This has caused some bitter feeling

among the agents, and especially so since the matter already has been dragged into the courts.

The fight entered the courts when the dealers turned down the Jungclas Automobile Co. which asked for space to exhibit the Overland car. Jungclas displayed his cars at the first show, and although a member in good standing of the dealers' association he was refused the right of placing his models in Music Hall. Jungclas took his case to the common pleas court last Thursday and Judge Cosgrave decided in favor of the dealers' association. The next day the Court of Appeals reversed Cosgrave's decision.

The decision of the upper court was concurred in by two judges, with one judge dissenting. It was held that the dealers had no power to eliminate Jungclas since the latter was a member of good standing in the association. Just as soon as the Court of Appeals allowed the injunction Jungclas and his lawyer went up to Music Hall and picked out space for the Overland exhibit.

The Overland exhibit in the first show was entered under the name of the Southern Motor Car Co., but the Dealers' association understood that Jungclas was back of that company and for that reason did not have any desire to award him space. This is the first time that a dealer has gone to the courts in order to be allowed to exhibit his wares at a motor show, so far as is known.

It is not known just how long the dealers' association will hold aloof from the Trade association. Each claims that it can get along just as well without the other and the breach appears to be widening right along.

Business in this territory during the past year picked up quite a bit compared to the year before. The dealers look towards 1914 as one of the good years for sales. In 1911 there were approximately, 3,400 cars in Cincinnati. The following year saw an increase of about 1,100 and last year the total reached over 6,500. For the first two months of the new year the sales have amounted to about 150 with the result that in round numbers there are in Cincinnati today 6,650 cars. The machine most sold seems to come from the \$1,000-\$1,250 class. The territory includes a large per cent of farming population.

The Overland, Buick, Ford, and Studebaker agencies report themselves in great shape and if there is any pessimism in the



country right now they can not locate it. Harry Leyman, of the Leyman-Buick Co. and president of the Cincinnati Automobile Dealers' Association reports that he sold about 45 per cent more machines in 1913 than he did in 1912. Throughout the tobacco districts of Kentucky the sales during the past year took enormous jumps. The tobacco crops were good and the farmers invested their money in cars.

#### PITTSBURG DISPLAY CLOSES

Pittsburgh, Pa., Feb. 23—The fourth annual exhibition of the Pittsburgh Auto Show Association closed in a blaze of glory Saturday night, February 21 after a week of brilliant success. From every standpoint the show justified the great expense to which both management and exhibitors went to make it the best ever seen in Pittsburgh. First of all the crowds came. Then many who came bought cars.

Others became excellent prospects. Everybody seemed interested. In beauty and completeness the show easily eclipsed anything heretofore seen in Pittsburgh or western Pennsylvania.

Somewhat out of the ordinary was the big display of motor trucks. In no other city, perhaps, would this have been of such deep interest as in Pittsburgh. Because of the intense industrial activity in this community any vehicle of commercial value is at once interesting to the Pittsburgher. Like all other cities, Pittsburgh is just beginning to appreciate the motor truck.

The cyclecar, too, was a magnet that drew the crowds. This light type, practically unknown in Pittsburgh, was a good seller.

Manufacturers and accessory dealers experienced unusual benefit from the show, according to their own statements.

## Success Crowns Kansas City Effort

### Sales and Attendance Forecast Year of Prosperity in Southwest

KANSAS CITY, Mo., Feb. 23.—The great southwest demonstrated to motor dealers last week that it would buy more motor cars this year than ever before. The local show held by the Kansas City Automobile Dealers' Association closed Saturday night, after a week of record attendance, sales and enthusiasm. The 3,000 dealers from the southwest territory who look to Kansas City as their distributing point reported that the temporary financial stringency caused by the drought last summer had passed and that they were prepared to increase their sales of last year by at least 25 per cent.

The Kansas City motor sales in 1913 amounted to an approximate \$28,000,000. The expected increase this year will bring

it to an even \$35,000,000. The local trade territory embraces the western half of Missouri, all of Kansas, the southern part of Nebraska, the eastern edge of Colorado, all of Oklahoma, northwestern Arkansas, the northern part of Texas, including the Panhandle and sections of New Mexico and Arizona. Figures advanced by the local dealers' association show that this territory ranks third in the United States as a motoring section.

#### Big Sales Despite Drought

Kansas last year bought motor cars and accessories to the value of \$26,500,000, despite the drought. Today a few more than 34,000 acres are owned, principally by farmers, there. The purchase of cars in the other sections of the Kansas City deal-

ers' territory has been estimated as follows:

Missouri .....	\$6,600,000
Oklahoma .....	4,950,000
Nebraska .....	1,980,000
Texas .....	990,000
Arkansas .....	660,000
Colorado .....	660,000
New Mexico .....	660,000

Practically all of that business came through Kansas City, and handled by the seventy-eight dealers in passenger cars and trucks and the fifty-five dealers in accessories. One company sold 5,000 cars out of its Kansas City branch last year and another 3,000.

The southwest speaks in millions to the motor manufacturer and dealer. One tire company here estimated its last year's business at \$3,000,000, another at \$1,000,000. The value of the tire business here is evidenced by the fact that four new tire agencies have been opened here in half as many months.

#### Southwest a Fertile Field

The show held here last week was only one of the trade attracting methods of the Kansas City dealers' association. During last fall the association held its first business-winning tour, piloting twenty-five demonstrating cars a distance of 600 miles through a 6-day trip in northwestern Missouri. The 1914 models had just been announced and it was their first showing in the country. The results have been witnessed in the purchase of cars during show week. This year it is probable that three such trips will be made. One through central and northern Kansas already has been logged and two others through southern Kansas, western Missouri, and Oklahoma are being considered.

The representative car of the southwest is one costing about \$1,000, a five-passenger touring car, adaptable to country roads. It is a well-known fact that the largest percentage of Kansas-owned cars are owned on the farm. The farmer demands a light, strong machine, capable of carrying supplies to and from town, but useable



GENERAL VIEW OF THE KANSAS CITY MOTOR CAR EXHIBIT

as a pleasure car. He wants plainness and service. When that is demonstrated the Kansas farmer will purchase and then only. In the cities the car averages higher, probably as much as \$1,800.

The cyclecar lit into the show with a bang. The first of the little fellows was brought to Kansas City about the first of January. Five models were displayed last week and it was always a good bet that a large crowd was listening to their demonstrators.

Only one car is manufactured in Kansas City. That is the Stafford, a pleasure car, of which 125 will be made this year. An assembling plant of the Ford company, employing about 250 men, and which is being doubled in capacity, also is located here.

#### HARTFORD MOTOR SHOW OPENS

Hartford, Conn., Feb. 21.—With every prospect of success, the seventh annual show of the Hartford Automobile Dealers' Association was opened at 8 o'clock this evening by Mayor Louis R. Cheney. This 1914 show offers a big contrast to the show given a year ago. It is about one third the size, about the same number of dealers have displays but no trucks are shown. The Park Casino is the scene of this year's exhibition and while not as well suited for an exhibition of this nature was about the best the dealers could secure on their failure to agree to the terms of the armory officials with whom they held several meetings in an effort to again have the show in the new state armory, the floor space of which is said to equal that of Madison Square Garden. The idea this year is not to attract a big throng. On the contrary, the show is planned as an "all business" exhibition.

Judging by the attendance this evening the show will be a big success. Many of the out-of-town dealers were in attendance. There was marked interest in the cars displayed. This 1914 show is truly representative of the American industry. The lowest priced car on display is the Imp cycle car, the highest priced being the Pierce-Arrow, Packard, Peerless and Stevens-Duryea. As Hartford is the natural trading center for a large outside territory a good attendance is certain. Thirty-three different makes of gasoline cars are shown and of these 16 are six-cylinder types. There are three different makes of electric pleasure cars on display. There are four accessory exhibits.

Prospects of a good year are very bright. The 1913 season showed a material gain over the previous selling year and from the sales reported by the dealers to have been made to date, 1914 will be a record breaker.

Every dealer is a show booster this year. There is pronounced good feeling and prospects are very bright. The Hartford show continues throughout all next week. Many of the dealers are holding overflow shows in their salesrooms and service stations.

## Indianapolis Dealers In Opening

### Private Displays of 1914 Models Held in Salesrooms of Hoosier City

INDIANAPOLIS, Ind., Feb. 23—The annual motor car opening, or show, under the auspices of the Indianapolis Automobile Trade Association, began today and will continue all week. Each concern is exhibiting in its own place of business, except that a few companies have found it advisable to take temporary quarters closer to the downtown district for the week.

Last year a combined show under one roof was given in the coliseum at the state fair grounds. The worst flood in the history of the city made it impossible to reach the fair grounds for several days during the show. In 1912 a combined show was given in a tent close to the downtown district. While this was successful financially, the attendance was not as large as it would have been had there been warmer quarters. The city has no building large enough that is accessible to the center of the city. So until the city can provide a suitable building large enough and warm enough, the dealers and manufacturers are going to follow the old plan of each concern exhibiting in its own quarters.

Forty dealers are showing fifty-five different makes of cars in one hundred and eighty models. In addition probably fifty concerns handling accessories and sundries are exhibiting.

All of the sales rooms have special decorations. Many of them are giving flowers to the ladies and most of the places have arranged for musical programs during the afternoons or evenings. At 343 North Capitol avenue seven concerns are exhibiting the Haynes, Path-

finder, Marion and Brown commercial cars.

One of the most interesting features will be the parade to be held for old and new models tomorrow. Prizes are to be awarded to the oldest cars in line and to the concern having the largest percentage of models that had ever been manufactured by the companies they represent in line.

#### TACOMA CLUB STAGES SHOW

Tacoma, Wash., Feb. 20.—Under the auspices of the Tacoma Automobile Club, and the personal supervision of A. L. Sommers, secretary, the second annual exhibition of autos opened at the Glide rink February 16th, for a week. The large auditorium was decorated with the club's colors, green and white, together with a profusion of flags and bunting, which set off the half-hundred 1914 models of the various makes to advantage. Flower stands filled with carnations of various hues, backed by stately palms, graced each of the show compartments.

Not only was there a large and curious throng of sightseers, but many were there with their check books, to repay the dealers for their advertising work to make the show a success. Noticeable among the crowds were many business men and dealers from southwestern Washington and the Grays Harbor. This is a rich and growing territory, where Tacoma agencies disposed of hundreds of cars during 1913, and partially as a result of the present show, a large number will be sold during 1914, in adjacent territory.

Although competition yet is keen, it is not as destructive as in former years.



A CORNER IN CASINO EXHIBITION AT HARTFORD



# The Readers' Clearing House



## WHERE HAS THE CUTOUT GONE?

**Reader Gives His Views on the Necessity of This Accessory**

DIXIE, Wash.—Editor Motor Age—As a motor car driver and one who appreciates the use of a muffler cutout I cannot understand why designers are rapidly discontinuing this very important feature. Engineers have equipped their product with starters, electric lights, left drive and many of the other important features, because the public demanded them. Did owners demand that the cutout be left off? No.

The writer just received a letter from a factory stating their reasons for leaving this out. With their new design exhaust there is no back pressure, therefore the cutout was not needed. Further stating that a number of the principal cities forbid the use of the cutout. If there were a state law in my state prohibiting the use of the cutout I would still refuse to buy a car that was not equipped with this very important feature. When a car leaves the factory it is new and is not supposed to misfire, the carburetor works well, the engine runs smooth and the cutout is not needed then to detect troubles and help locate them. Neither do we need the tire pump if we don't get a flat tire, but after a car has seen a few months hard use in all kinds of weather with a beginner at the wheel we are apt to feel the car jerk, especially when pulling hard. What is the matter? How are we to locate the trouble? The first thing to do is to open the cutout which will nearly always locate the trouble which is a misfiring cylinder. Suppose the car has no cutout, it is necessary to stop, even if you can find the trouble to be misfiring, what is the next step? What causes it? Is it regular or irregular? All that is necessary is to open the cutout and you can tell clearly if it is caused by poor mixture or bad wiring because poor mixture would cause an irregular miss while the other would be regular. But if you have no cutout I suppose you would have to guess. If you were

sick the doctor would ask you questions to locate your troubles, but suppose you were dumb?

If your motor shows the least signs of not working just right just open the cutout for about a half minute and let it talk a little and nine times out of ten you can tell immediately what is the trouble. Is the cutout worth the few pennies that it costs?

Go in the garage and watch the mechanic adjust the carburetor and if the car is equipped with a cutout he will surely have it open and if there is none he will express his opinion of the maker is a more or less vulgar way.

If you think that the clutch is slipping you need the cutout or when in a mudhole, or on a hard pull you like to hear the motor when it is doing its best. The cutout is needed in many ways other than relieving the motor of the unnecessary back pressure on hard pulls. I have driven a car for three years and close the cutout only when passing teams. One maker, in describing their product, speaks of taking the hills with a snappy roar from the exhaust of their motor and now they have discontinued the cutout because Chicago and a few other towns prohibit the use of them when on the streets, and I will venture to say that at least 75 per cent of their output goes into districts where there is no such law. But even if it was the law of our entire country the cutout would still be worth many times its cost for testing purposes.

May others that read this express their opinions regarding the use of the cutout in the hope that the builders will equip their cars in the future with this inexpensive but very important feature.—Paul Thonney, Jr.

## HOW TO LOWER STEERING WHEEL

**Subscriber Shows by Photograph Results of His Work-Parts Necessary**

MOWEAQUA, Ill.—Editor Motor Age—I read in Motor Age issue of February 12 about C. M. Reed, asking you about the parts he would need if he lowered the steering wheel on his 1910 Oakland 40. In Fig. 1 is illustrated my 1910 Oakland 40 which I think has very racy lines. I lowered the steering wheel about 11 inches and all the extra parts I had to have was a piece of iron for which to cover the hole which was made. Also a new arm for the magneto, which fastens on to the steering column. Both of these pieces were made by a blacksmith at hardly any cost at all. The steering housing does not have to be touched. I have driven this car several thousand miles and have not had any trouble with the steering apparatus

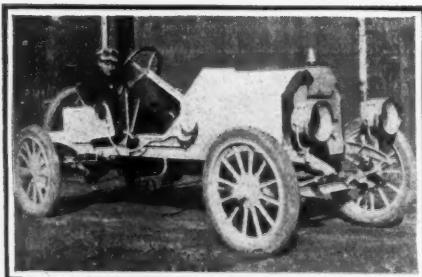


FIG. 1—A CONVERTED OAKLAND TOURING  
How reader lowered the steering post to give  
the car a racy appearance

in any way. I hope this will be of some help to C. M. Reed. If he would like to know more about converting his touring car into a roadster I will be glad to answer any questions.—H. B. Ayars.

## MINIMUM CHAUFFEUR'S AGE IS 18

**So Says Law in Illinois—Place of Examination**

HARVARD, Ill.—Editor Motor Age—What is the bore and stroke of the 1913 Model 31 Buick?

2—What is the highest r. p. m. of the average motor?

3—What is the gear ratio on high of the 1912 and 1913 Reo?

4—What is the bore and stroke of the Reo motor?

5—What age must a person be to become a licensed chauffeur in Illinois?

6—When and where must the examination for chauffeur be taken?—R. W. S.

1—The bore and stroke of the model 31 Buick is 4 by 4 inches.

2—The average motor shows about 2,500 r.p.m. maximum.

3—The 1912 and 1913 Reo has a gear ratio of 3.75 to 1 on high.

4—The bore and stroke is 4 by 4½ inches.

5—The minimum age is 18 years.

6—Examinations are held every morning at 737 Jackson Blvd., Chicago.

## VARIED QUESTIONS FROM OHIOAN

**Oldfield Barred for 1 Year, for Racing with Pugilist**

CATAWBA, O.—Editor Motor Age—What is the best shock absorber for a Buick six?

2—What is the best way to remove carbon from a motor?

3—Does scraping the points of a spark plug injure them in any way?

4—Why does the Ford car receive so much criticism?

5—Is the Schacht car still being manufactured?

6—Was Barney Oldfield ever barred from the racing association? If so, why can he run in the Santa Monica events?

7—Is the Garford passenger car still being manufactured?—R. W. Faverman.

1—Any of the makes on the market is satisfactory.

2—The best method is the one which may be accomplished in the shortest time and which removes all the carbon. Some repairmen believe the only efficient way

## Questions Answered and Communications Received.

Paul Thonney, Jr.	Dixie, Wash.
O. Wemark	Ridgeway, Ia.
Robert Halerow	Bowesmouth, N. D.
Earl Ailen	Zearing, Ia.
C. M. Shurtliff	Harbor Springs, Mich.
M. T. Minogue	Philadelphia
C. Christiansen	Chicago
Reader	Fort Worth, Tex.
R. B. Tucker	Inglewood, Cal.
A. Reader	El Paso, Tex.
R. W. S.	Harvard, Ill.
Reader	Morton, Minn.
H. B. Ayars	Moweaqua, Ill.
R. W. Faverman	Catadba, O.
R. P. Dudley	Bridgewater, Va.
Greencastle	Greencastle, Ind.
F. Burnes	Smithville, Mo.

to remove carbon is by removing the cylinders and scraping the carbon. Others have obtained identical results with the oxygen method as with the scraping process. Much depends on the design of the motor. Some with removable cylinder heads are best scraped usually by removing the heads and scraping.

3—Scraping slightly will not injure the plug, but if a slight burr is left, this may become red hot later and cause preignition.

4—With 400,000 such cars on the roads there is no cause for criticism when the price is considered.

5—The Schacht passenger car no longer is being manufactured.

6—Oldfield was barred from racing for 1 year, by the A. A. A., for competing in a race with Johnson the pugilist. This occurred about 3 years ago. He was later reinstated.

7—No.

#### LIMIT OPENING OF INTAKE VALVES

Those of the Automatic Type Should be Fitted With a Stop

Greencastle, Ind.—Editor Motor Age—I have a two-cylinder 3.5 by 3.5 engine with automatic style intake valves. In having new cages made should the valves have a stop to limit their opening to, say,  $\frac{1}{4}$  inch, or should they span as far as suction will pull? I have read that they would chatter if too wide.

2—In such an engine, vertical cylinders and pistons having identical motion, should the breather not be very large? The one attached is only  $\frac{3}{8}$  inch pipe size.—Greencastle.

1—They should not open as far as suction will permit, but should have a stop. A clear opening of  $\frac{1}{4}$  inch is a good figure. Automatic valves flutter usually because of weak springs.

2—The breather you have is of sufficient diameter for the motor.

#### MORE ADVICE ON SOOTY PLUGS

Dakota Motorist Blames the Carbureter—Outlines the Case

Bowesmout, N. D.—Editor Motor Age—I notice that C. Michel, of Marion, Ia., has had trouble not being able to keep the plugs of his motor clean or to hit evenly on all the cylinders. With the same kind and size of motor, magneto and carburetor, I had a great deal of trouble and tried nearly everything before I found the real cause of the trouble. The Schebler model L carburetor has a brass track on which a little wheel works back and forth to open and close the needle valve, the little wheel being a part of the needle valve attachment. This track became bent in some way and would open the needle valve in moving it about  $\frac{1}{4}$  inch from low to give enough gas to go 20 to 25 miles an hour and when this was the case I could make no proper adjustment of the air valve or needle valve. I removed the track and straightened it, and put it on again. Upon opening the air valve until it was about 1 to 2 turns from the top, and setting open the needle valve about  $1\frac{1}{2}$  to 2 turns from shut, the motor went like a new one. The plugs were not cleaned when this

change was made and upon opening the cutout on slow or high speeds the exhaust was even and clear and when I started after this adjustment I could go up to 35 or 40 miles per hour with ease and quickness.—Robert Halerow.

#### HAS TROUBLE IN PAINTING CAR

Lamp Black Not Suitable—Why Paint Shows Streaks

Ridgeway, Iowa—Editor Motor Age—In painting a car black, is lamp black used? If so, with what is it mixed? I have noticed that when a car is painted at a local paint shop the brush marks always show, while when it is done in a factory, the surface is smooth and glossy. Is the difference in the process, paint, brushes, or does it come from long experience? I notice in a recent story in Motor Age you do not say to sandpaper the paint after each coat and notice others advise this. I can never get results from ready mixed paints as all seem to contain some varnish, which makes it impossible to apply the paint evenly. You mention a paint remover and other things and advise going to a paint shop for information. There is no paint shop in this vicinity.

2—Will Motor Age kindly refer us to some firm dealing in such paints, varnishes, brushes and remover, that could furnish the information desired?—O. Wemark.

1—Lamp black is not used for painting. The brush marks are the result of either poor workmanship with the brush or poor judgment in getting the body ready for the brush. The part to be painted must be perfectly smooth. The sandpapering is done only at the beginning and before any actual painting is done. The instructions in the painting story referred to, call for treatment with powdered pumice after the paint has dried and before the varnish is applied. The pumice as stated removes the high spots and makes the surface smooth. With a rough surface the finish will be streaked.

2—Proper paints and varnishes for motor cars may be obtained of any of the following: Forest City Paint & Varnish Co., Cleveland, O.; C. A. Willey Co., New York; Hanline Bros., Baltimore, Md.; Sherwin Williams, Cleveland, O.

Paint removers are obtainable of the following named concerns: Detroit White Lead Works, Detroit, Mich.; Glidden Varnish Co., Cleveland, O.; Chalmers Chemical Co., Newark, N. J.; Berry Bros., Detroit, Mich.

Suitable brushes may be bought of these concerns: Bradley & Smith, New York; John Lucas & Co., Philadelphia, Pa.; Osborn Mfg. Co., Cleveland, O.

#### CAR WILL NOT PICKUP PROPERLY

Double Jet Carburetor May not Be Adjusted Correctly—Valve Trouble

Bridgewater, Va.—Editor Motor Age—Kindly tell me what causes my Oakland 42 1913 model to misfire at different speeds. It misfires mostly when accelerating on bad roads after having run about 18 or 20 miles. The battery is fully charged, carburetor is adjusted properly, no leaks in manifold, valves are tight, new spark plugs installed, all connections are tight, have put on new commutator brushes, and the motor has good compression. When running at 35 to 40 miles per hour it fires regularly, but have most trouble picking up.

2—What powered motor should be used in a car weighing 3,600 pounds, geared  $3\frac{1}{2}$  to 1.—R. P. Dudley.

1—Poor valve adjustment would interfere with the pickup. Another common cause is due to carburetor adjustment. In

some double jet types a good running mixture is obtained so that the car will operate well at high speeds, but is so adjusted as to make pickup difficult. The Oakland 42 uses a double jet Schebler model O and you may have it adjusted for speed work, but have neglected pickup. Are the spark plug points adjusted properly?

2—This depends upon the speed you wish to get from the car. The average car of about 3,600 pounds and geared  $3\frac{1}{2}$  to 1 carries a 40-horsepower motor.

#### TIMING MAGNETO ON A CHALMERS

Method is Simple—Getting the Valves in Proper Working Order

Smithville, Mo.—Editor Motor Age—Explain the method of timing the magneto used on the 1910, model K, Chalmers.

2—Also the method of valve timing.—F. Burns.

The method of timing the magneto on the 1910 Chalmers follows. Remove the plug on top of the flywheel case so that the marks on the flywheel are visible. The first step is to get No. 1 piston on top dead center. Open all the petcocks and turn the motor over until the mark DC 1 & 4 is in the center of the hole over the flywheel. Set the magneto in place and connect the universals but do not pin them. Use a set screw until the proper timing is found. Remove the distributor cover of the magneto and set the distributor arm on No. 1 segment which is that in the lower left corner looking at the magneto from the seat. With the distributor set for No. 1 cylinder turn the armature shaft over until the interrupter points or breaker points as they are called often, are just beginning to open. The advance lever should be in its uppermost position when this is done. Tighten the setscrews and then turn the motor over and see that the breaker points just open when the flywheel mark DC 1 & 4 is in the center of the hole in the flywheel case.

2—With the plug on top of the flywheel case removed turn the motor over until No. 1 exhaust valve just closes. It will be closed if you can turn the push rod underneath the valve. At this point the mark on the flywheel "Exhaust Closes" should be across the center of the hole. If the mark is not to be seen turn the motor over until that mark is over the hole and then adjust the exhaust tappet No. 1 until it makes the valve seat. Turn the flywheel

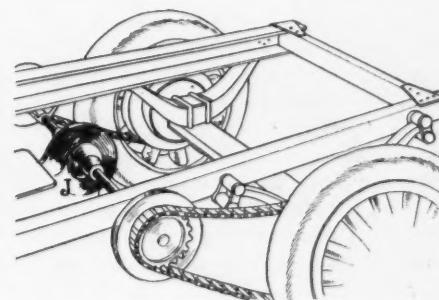


FIG. 2—ILLUSTRATING A JACKSHAFT.  
The word applies usually to the shaft J in a chain-driven car

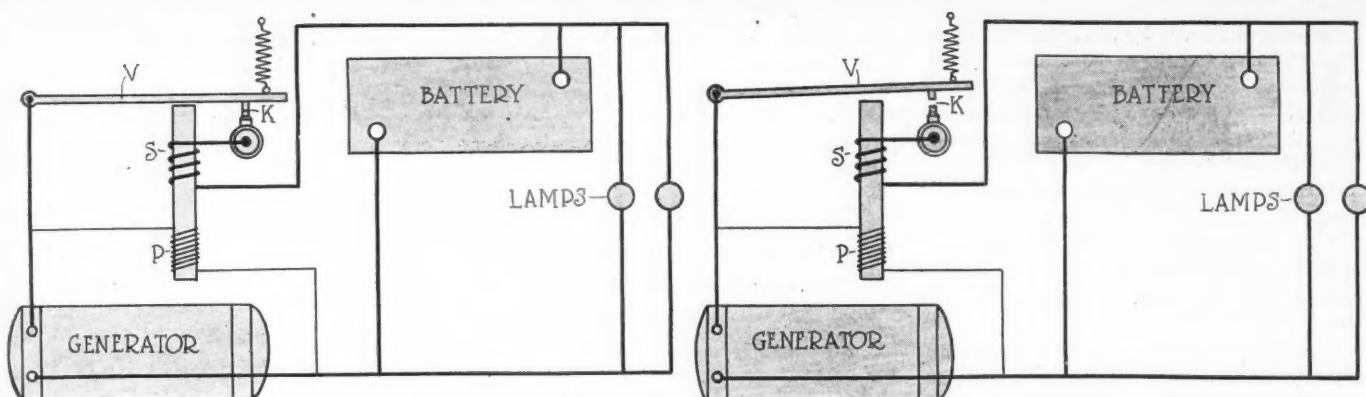


FIG 3—OPERATION OF AN ELECTRICAL CUTOUT AS USED IN LIGHTING SYSTEMS

At the left is shown the armature *V* in contact and when in this position current is permitted to flow from the generator through the heavy winding *S* to the battery, thus charging it. In the right illustration the armature is off contact and the generator current flows through the fine winding *P* and back to the generator.

a little in the same direction as when cranked and the words "Inlet Open" will appear. The inlet valve on No. 1 cylinder should just start to open at this point. If it does not adjust the push rod until it does. The cylinders fire in the order 1, 3, 4, 2. The flywheel is turned until the markings appear again and this time adjust valves in cylinder No. 3, the next time in cylinder No. 4 and the fourth time the marks appear cylinder No. 2.

#### DISCUSSES TWO-POINT IGNITION

##### Gives His Reason for Believing It Better Than Single Spark

Philadelphia, Pa.—Editor Motor Age—With the improvement, development and general refinement of the gasoline motor as a power plant, the ignition system has kept well its pace in the ranks. The importance of the ignition system, for accuracy and reliability, cannot be underrated, as it is needless to say, no matter how perfect a motor may be in all its other parts, with imperfect ignition, everything seems to go wrong. All the parts of an electric ignition system, as used today, are mostly delicate, from the source of current supply, to the spark plug. Each unit or part composing the entire system, must be an article of real merit, or trouble is a certainty; the very best battery or magneto, forming a current supply, cannot properly and effectively deliver a good hot spark through a defective or poorly constructed spark plug.

Now, we will take into consideration, a perfect ignition system, with its various units, working to the highest point of efficiency, and which delivers a spark to the plug located and entering the combustion chamber, at a point generally, at one or the other farthest sides from the center of the cylinder, the common practice being to place the spark plug over the intake or exhaust valve. The ignition, thus taking place at one side of the compressed gases, requires a fraction of a second to ignite across to the opposite side. This lag is compensated by advancing the spark, so that the actual ignition, or the beginning of the ignition, is slightly premature, and by the time the entire gas is ignited under

compression, the impulse is imparted to the piston, at exactly the proper time. In a T-head motor, the intake valves are located on one side, and the exhaust on the other. When the motor is running at speed, a certain portion of unconsumed gas passes into exhaust, depriving the motor of its full capacity of power, on account of the piston not receiving the full impulse of ignited gases.

In two-point ignition the gases are ignited in a combustion chamber at two different places, at the same time, and those opposite points located as far as possible from the center of cylinder or piston, the flames spread twice as rapidly as if ignited from one side only. Both flames unite at the center over the piston, and consume every atom of compressed gas. As the two flames rush together from the exterior to the interior, of the combustion chamber, and amalgamate across the center over the piston, the power increase has risen to a remarkable degree, safely estimated at from 15 to 25 per cent, depending on the size of the cylinder area.

There are two logical reasons for this increase of power; first, the propagation of the two flames being so rapidly and merging; second, the consumption of the entire charge of compressed mixture. This is so plainly exemplified by lighting a piece of paper at two opposite sides instead of at one; note how much more quickly the paper is consumed when lit at two points, than it would be if lit at one, and also note the increased intensity of the two flames when uniting. The above explains what is occurring in your motor with the single system, and also what will occur by using the two-point ignition system. It might be asked what is the result obtained by two point ignition, and what are the benefits gained? I will answer by stating, the result will be a wonderful increase in actual power, a saving of fuel, by consuming all of each charge of gas, and a greater flexibility and more true balancing of the motor, with a less tendency to accumulation of carbon in the cylinders.

The same principle works as well on an L-head head motor as on T-head. Six builders of high class cars, that were seen at the New York show, had two-point igni-

tion as standard equipment. The writer has experimented with two-point ignition for years and obtained the results herein described. Two-point ignition has come, and it has come to stay. It will soon be standard equipment on all cars, big and little. The users of cars are fast awakening to its real merit and economy, as its cost is so trifling.—M. T. Minogue.

#### OPERATION OF LIGHTING CUTOUT

##### Device Used to Protect the Generator from Injury—Functions of Parts

Chicago—Editor Motor Age—I would like to have the operation of a cutout as used in starting and lighting systems, explained. How are the parts arranged. If possible show by diagram the various members and tell the functions of each.—C. Christiansen.

There are many forms of electrical cutouts in use but the principle in each is practically the same. Essentially the cutout consists of an iron core wound with two windings, *P* and *S*, as shown in Fig. 3, the former being of many turns of fine wire and the latter a few turns of heavy wire. At the end of the core is a piece of metal, *V*, called an armature, which has a spring attached as shown. The armature may make contact at the point *K*. When the core is magnetised the armature is attracted in the same way as the vibrator of a coil, and when the core is demagnetised the armature leaves its point of contact.

When the gasoline motor is started the electric generator sends current through the cutout and when sufficient speed has been attained and enough current generated to magnetise the iron core, the armature *V* is attracted as shown in the illustration at the left. The current then flows through the points at *K* to the winding *S* and then to the battery and from there to the lamps. The current flowing to the battery is what is known as the charging current, which tends to keep the battery up to capacity.

As soon as the motor speed decreases, the generator geared to it turns more slowly and the current output of the generator drops. The battery current will then try to discharge back into the generator and if the cutout were not in the circuit the generator would be injured. The current from the battery flows back through the

eutout and in doing so removes any magnetism present in the core which in turn causes the armature V to be freed. This leaves conditions as at the start with the battery supplying current for the lights and the generator running slowly. As soon as the motor operates more quickly the iron core is again magnetised and the process mentioned above is repeated.

#### METHODS OF WIRING HEADLIGHTS

##### Single and Double Systems Explained—

###### Location of Meters

Harbor Springs, Mich.—Editor Motor Age—Kindly explain by diagram the plan of wiring to be used in operating the headlights of a small car with a 6-volt direct current dynamo and storage battery. There is to be a cut-out used to automatically cut out the dynamo, and switch on the battery when the dynamo output is less than 6 volts as when the engine is running slow or not running at all. Where would an ammeter and voltmeter be connected if used? What size lights should be used? Could a ground be used and if so could it be the frame of the car?—C. M. Shurtleff.

There are two simple systems in use for wiring, these being known as the single and double-wire systems. There is another known as the three-wire system but it would not be suitable for your needs.

In the single wire system the frame of the car is used as a return circuit as shown in Fig. 4. It will be noticed one terminal of the battery, dynamo, lights, etc., is grounded to the frame. In the double wire system shown in the lower illustration there are no ground circuits. The illustrations show the relative positions of the cutout, etc. An ammeter always is wired in series with the line and a voltmeter in parallel or across the line. With a 6-volt generator use 6-volt lamps.

#### HIS VIEWS ON ELECTRIC LIGHTING

##### Californian Prefers Acetylene and Gives Reasons—Some Experiences

Inglewood, Cal.—Editor Motor Age—I have just been interested in the discussion between the advocates of the two systems of lighting. There is one item that I have not seen mentioned, it is, that a car equipped with the electric system costs about \$125 more than one with acetylene. Six per cent interest on \$125 is \$7.50, enough to keep the average owner in gas lights for a year. Also a car will last probably about 10 years and at the end of that time the electric generator will go into the discard along with the rest of the car, that would be the same as \$12.50 per year, or a total of \$20 per year for interest and depreciation. In the case of the gas tank, you would simply take it off your old car and strap it on to the new one.

As to reliability, a party was on the road for about  $\frac{1}{2}$  hour and during that time met quite a number of motor cars returning from the beach. We counted three electrically equipped cars, each with only one of the two headlights burning, while two cars equipped with electric lamps had neither head lights burning. Some will say, it is easy to carry an extra bulb or two, but you would have to stop and put

them in. Suppose every part of the car was as unreliable, you would have to carry a few extra springs, axles, transmissions, etc., and then there would not be room enough for the passengers. As to the blinding quality of the electric lights, we all have our own opinions, regarding this. One man advises getting a light just as blinding as the other fellow so he will be on an even footing with him, but in practice I do not know that it makes much difference which man is blinded, if the cars come together the result is about the same. I believe a starter is a good thing, but the electric, at present, is too complicated, costly, liable to get out of order and requires too much attention.—A. B. Tucker.

#### FUEL CONSUMPTION OF MANY CARS

##### Weights Given Also—Car Maker Usually Guarantees Parts

Fort Worth, Tex.—Editor Motor Age—What are the weights of the following cars, latest models fully equipped: National 40, National Six, Marmon 32, Mercer, Packard 38, Cadillac, Lozier Four, Lozier Six, Stutz Four and Six? How far will these cars average per gallon of gasoline?

—I have heard the Six is correct in theory but not in practice. Is this so?

—Is the Buick company interested in the manufacture of the Paterson?

—Will a four of  $4\frac{1}{2}$  bore and 6-inch stroke be more economical than a six of  $3\frac{1}{4}$ -inch bore and  $5\frac{1}{2}$ -inch stroke, more powerful, and will it have easier running qualities?

—Is there a semi-racing roadster six built by the National company?

—In an assembled car, if the motor, steering gear or any other assembled part becomes defective after using a short time, is the maker of the part or the assembler responsible for the replacement of the part?—Reader.

—The cars you name with the weights suffixed follow: National four, 2,800; National six, 3,000; Mercer, 3,200; Packard, 2-38, 4,425; Cadillac, 3,950; Lozier four, 3,700; Lozier six, 4,000; Stutz four, 3,450; Stutz six, 3,450.

—The mileage per gallon follows: National six, over 10; National four, 13; Mercer, 14-16; Packard, 2-38, 10; Cadillac, 12; Lozier four, 13-14; Lozier six, 10-14; Stutz four, 12; and the Stutz six, 10.

—No.

—As far as Motor Age know there

is no connection between the Buick and Paterson companies.

—It may or may not. All depends upon design. The Moline Knight, a 4 by 6-inch motor, showed wonderful results which could not be equaled by a poppet motor, all due to design.

—No. only the regular type.

—The maker of the car usually gives a guarantee. The maker of the parts is not responsible to the car owner.

#### MAGNET SHOULD LIFT 15 POUNDS

##### Condenser Prevents Arcing at the Interrupter Points

Morton, Minn.—Editor Motor Age—How many pounds should the electro magnet be able to lift for charging magneto magnets?

—At what temperature will kerosene vaporize readily? What is the specific heat of kerosene approximately?

—Will a condenser, if shunted across the breaker, keep the platinum from burning off, if so what should its capacity be? Will it increase the heat of the spark?—Reader.

—About 15 pounds.

—Kerosene will vaporize at about 200 degrees F. The specific heat of kerosene is about .45.

—The condenser in most ignition systems is shunted across the interrupter points, to prevent arcing. The capacity of the condenser depends entirely upon the system in which it is installed. The heat of the secondary spark will not be altered appreciably.

#### Meaning of Jackshaft

Zearing, Ia.—Editor Motor Age—Kindly give an explanation of a jackshaft.—Earl Allen.

A jackshaft is one from which the rear wheels of a chain-driven car are driven. The jackshaft as so defined is illustrated in Fig. 2. The jackshaft may operate the rear wheels through belts or direct gearing. Some, make jackshaft synonymous with countershaft and include secondary shafts in the gearset as jackshafts. Secondary shafts are those driven by the main shaft.

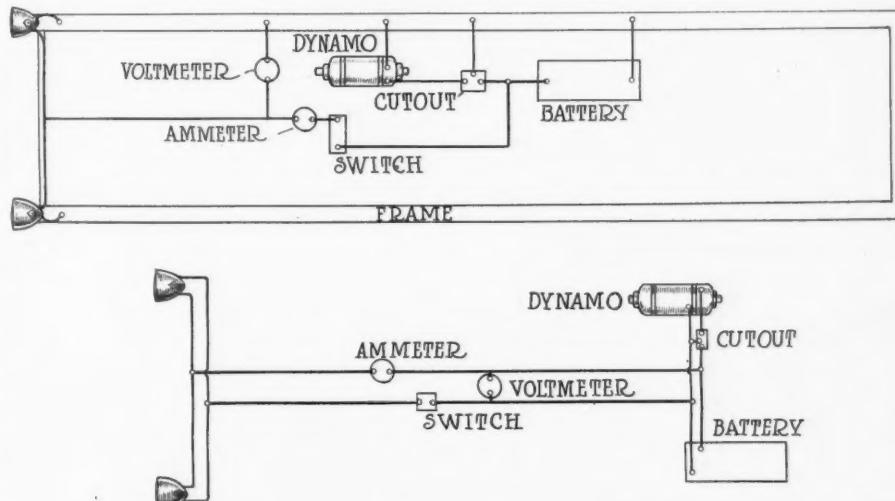


FIG. 4—TWO METHODS OF WIRING HEADLIGHTS FOR A CAR

The upper illustration shows the single-wire system in which one terminal of the lamps, battery, generator, etc., is grounded to the frame. The lower illustration shows the double-wire system in which no grounded circuits are made. In both cases the meter positions are shown

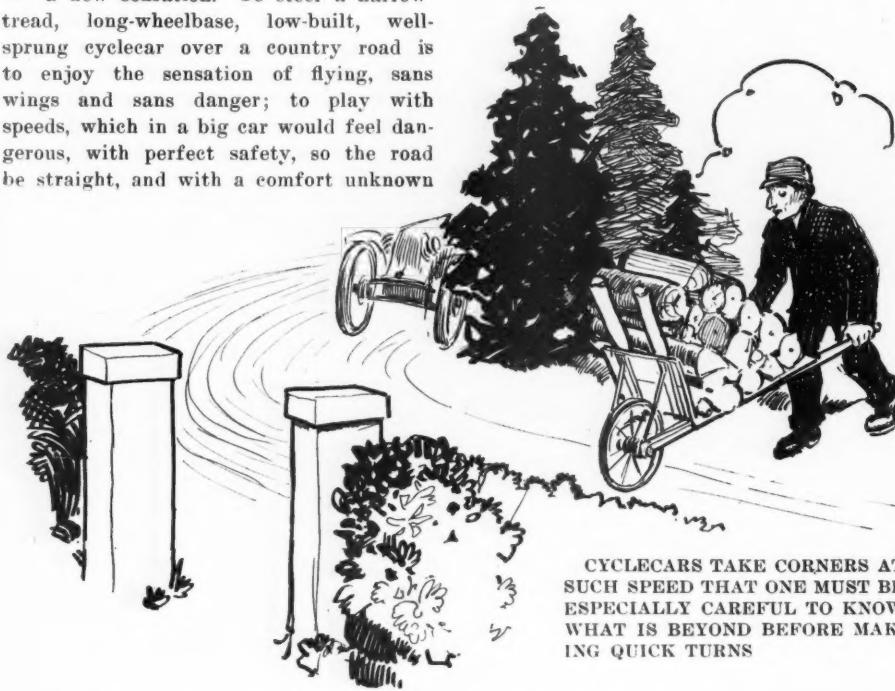


# Cyclecar Development

## How to Behave in a Cyclecar—Special Caution Necessary

**T**O DRIVE a cyclecar is to revel in a new sensation. To steer a narrow-tread, long-wheelbase, low-built, well-sprung cyclecar over a country road is to enjoy the sensation of flying, sans wings and sans danger; to play with speeds, which in a big car would feel dangerous, with perfect safety, so the road be straight, and with a comfort unknown

By William B. Stout



CYCLOCARS TAKE CORNERS AT SUCH SPEED THAT ONE MUST BE ESPECIALLY CAREFUL TO KNOW WHAT IS BEYOND BEFORE MAKING QUICK TURNS

in any other form of motored road vehicle. There are new things to be considered in driving a cyclecar as well as in its design, for the new road possibilities and comfort-safety factor impose new duties on the driver while the very diminutiveness of the vehicle make one look out for new things.

### New Consideration Involved

In a big car, if one travels along at a 20-mile-an-hour average, he feels that he is going about as fast as safety will permit. He is high from the ground, and the vehicle sways from side to side as bumps are hit by one wheel or another. Following in the ruts the wheels meet rolling places and sudden drops and with the heavy weight of axle beneath the springs, or in the cheaper cars with short and stiff spring as well, the driver must look sharp or he will find himself hitting the top or going out over the windshield.

On the same road the cyclecar driver finds himself no higher up from the road than if he were sitting in a rocking chair on the same road, and he sits, too, with his feet out in front at a greater angle than on a big car. Many consider this an uncomfortable position, but if the seat be long so that the knees are supported, this type of seat is more comfortable than the vertical kind, and it gives a feeling of security against being thrown forward not felt in high seats.

Given this security of low position and

straight sitting, the rider, when he first sits in the car, has a sense of safety at once from the very feel of things. The next thing is to get on the road and feel the further safety factors. It is taken for granted that the novice is riding in a car with very resilient, long springs and a wide range of vertical action.

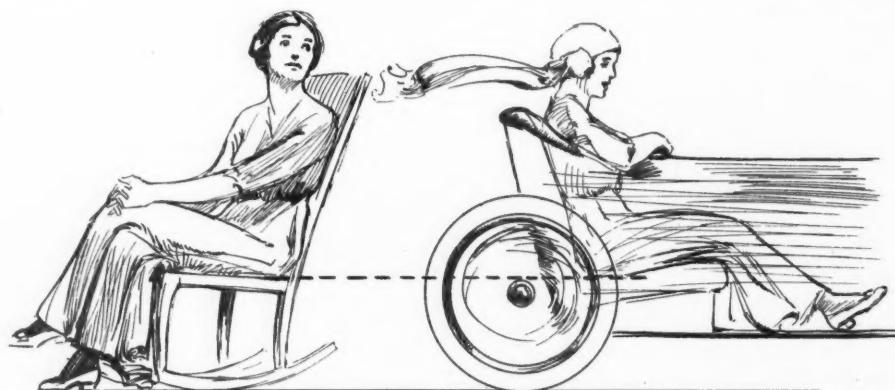
The motor is given a quarter turn and starts with a roar. There is some vibration as it races away and noise, as well, but the driver quickly throttles down, takes his seat and gently lets in the friction on low. There is no gear noise nor grab, but the little toy-appearing vehicle slides comfortably away and the journey is begun.

The first wonder is that you cannot feel an axle under you. On a big car, even on asphalt, one can feel every roll of the pavement. So far as this is concerned, on the cyclecar you notice little difference whether you are on asphalt or cobble stone. The wheels bob about like mad, but the light weight in proportion to your weight, and the very resilient springing throws very little reaction up into the car. Off the asphalt you go onto rough cobble, and still the comfort prevails. Off this onto a dirt road in the country, and the comfort increases. Indeed a dirt road is more comfortable than a poor asphalt for any car.

### Begins to Enjoy Scenery

A run of a mile or so, and the car is rolling along at an easy 30 miles per, when a rough bridge looms up ahead. The novice grips to the seat, but the driver leaves the throttle alone. At last we hit, when wonder of wonders there is no shock! Only an easy roll and all is level again. At this the novice sits back and begins to enjoy the scenery. This is real sport.

The next experience is a turn with perhaps a mudhole in the middle. Again the throttle is left alone, and with the novice frantically leaning in, but the driver sitting tight, the car swings sharply at over 20 miles per hour, with no sign of skid, takes the turn and is on again. Here is a straight road and the throttle pushes up and up, until both passenger and rider slide down into the seats to miss the roar of air over the cowl. A touring car is ahead, the riders smiling out behind in happy derision perhaps, or with patronizing air. A swing to the left, a short ride at a 20-degree angle on the side of a bank, and the touring car is eating the dust which had momentarily slowed down the cyclecar. "Great!" cries the novice



A WELL DESIGNED CYCLECAR HAS THE SEATS BUT LITTLE HIGHER FROM THE GROUND THAN A ROCKING CHAIR, GIVING THE RIDERS A NEW SENSE OF SECURITY, AND A NEW EXPERIENCE IN SPRINGING

and slaps the driver enthusiastically on the back, "let me try 'er."

So, for the return trip, the novice takes the wheel. "This is the spark lever and this the throttle and when you want to stop push that pedal. To start push the other one." The motor races like mad, but with the lever in low you get away, a shift is made with ease by the new man into a higher gear and away back down the road you go. It is here that the novice, used only to motorcycles, gets the real cyclecar fever. The machine steers as easily as a bicycle with no reaction through the wheel even on the roughest roads. The motor control and power is ideal, and the gear changing the easiest thing in the world. You come to a steep hill and the expert from the rear leans forward and gives instructions. "Drop your gear as you go up just enough to keep the motor at its best rate of speed." The new hand makes a mistake and kills the motor just at the steepest part of the hill.

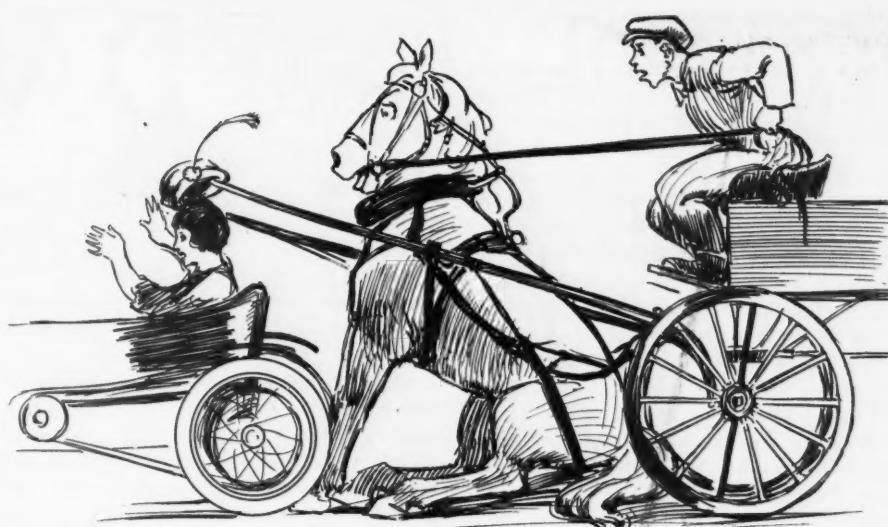
"I'll take 'er here," says the expert, "and you can take it again at the top." He cranks the motor again or starts it with a pull of a lever and takes his seat. A start is made on low, the speed is shifted in the middle of the hill and at the top the car is making an easy 20-mile-an-hour. It all depends on practice.

#### At the Journey's End

At the journey's end the novice is ready to take a car home with him and is only restrained from doing so by the assurance that it will be 2 months, perhaps, before he can get one. "I'll take the first one you can get then," he says, only to find dozens ahead of him with money already down. At that, he takes a chance.

The things which a cyclecar can do in safety give the driver such a sense of security that — when cyclecars are developed to the reliability which they will be capable of — the driver of these little, 36-inch tread machines will make a greater average of speed on country roads than the big cars. He cannot hit a bump that will throw him from the seat for car and passenger seem to move together. He does not need the cushions of great depth needed on a big car, but as on a bicycle, feels more comfortable on a mere padded cushion, leaving the shock absorbing to the car springs. He does not fear turns for the car will not roll over, nor will it skid at average speeds. He is low to the ground and comfortable so why not use all speed that is safe?

There is a danger, however, in this very feeling of safety. The cars can be built to stand the new strains but the driver must watch the turns. He should never, in any case, drive when he cannot see further than his stopping possibility. If it takes him 30 feet to stop from a 20-mile speed, then when he can see but 30 feet ahead, he should run under 20 miles per hour. Less is better, for another cycle-



WITH THE CYCLECAR SO LOW, ONE MUST NOT STOP TOO QUICKLY WITHOUT KNOWING WHAT IS BEHIND

car might be coming in the opposite direction. On a turn one must watch, for men are not used to vehicles coming around turns as fast as the cyclecars will come.

In traffic, there is a danger which must be watched when driving into narrow places. Motor car drivers are not used to cyclecars and when they leave a 4-foot space at the side, may close it up at any time, thinking nothing is there. This may force the cyclecar into the curb. Cyclecars should all have a distinctive kind of a warning whistle or siren. An exhaust whistle is good.

Cyclecars can stop so quickly that one must watch out for this lest some real car runs up behind and folds down the back of the cyclecar like a steam roller — which suggests uses for a big luggage space behind other than to carry luggage.

As to handling a friction-driven cyclecar one has the advantage of being able to keep the engine speed fairly constant. If a motor pulls best at 1500 r. p. m.

then the driver, when he is aiming to make best speed and time, should keep the motor at this speed. If the pull on a hill draws it below this the gear should be shifted to a slightly lower position to race the motor up a bit, and so on, so that the motor pulls its best at all times. In this way the car will be able to climb almost anything in the way of a hill, though the rear gear ratio should not be too high. For level countries some cars are using 3 to 1 with success, others in hills use 4 to 1.

#### Save the Motor

In all driving save the motor as much as possible. Be sure there is plenty of oil and that the motor smokes on hills. Be sure the friction pressure is enough to prevent slippage but no more. Baby all the parts of the car you can and long life of the car will result, while keeping foremost the idea of "Safety First" in your mind when driving will ensure long life to the riders.

### Falcon Cyclecar Bucks Deep Snow

**S**TAUNTON, Va., Feb. 20—The heaviest snowfall in more than 20 years, sweeping down the historic Shenandoah valley, and followed by a cold wave more appropriate to Labrador than to the sunny south, gave the Falcon Cyclecar Co. an opportunity to subject its test chassis to another grueling experience with deep snow.

The factory, located on the wind-swept ridge of Richmond hill, overlooking the city, was surrounded by drifts unparalleled in the history of the southern town, from 10 to 12 inches in the level yard, and banked high against the buildings.

The snow was wet and packed solidly the first day of the storm, sticking to the wheels and piling up in front of the car. It took nearly 5 minutes of steady bucking to break through a 2-foot drift in front of the factory door, and during the entire morning the car broke trail around the

factory and along the road to Waynesboro with pounds of snow clinging to the wheels. In spite of the apparent risk of jamming the exposed pulleys, there was no sign of belt trouble, both belts giving splendid traction and clearing out the pulleys without difficulty.

In the afternoon a sharp freeze turned the snow to a crisp powdery condition, and through the half broken wagon roads the little Falcon began to do stunts, climbing long grades and breaking trails like a snow plow, although without chains, and with the non-skid nubbins worn smooth.

The fun ended when turning out to avoid a wagon, a snowdrift piled at a street corner confronted the drivers. They elected to "buck" it, and rushed it at full speed. A miniature blizzard of flying snow covered drivers and car, as the Falcon tore the drift apart, and the testing

crew returned hastily to the factory to be thawed out and dried.

The Falcon cyclecar proved its climbing powers February 4 by mounting a notorious mountain called Betsy Bell near Staunton, Va.—pronounced Stanton if you please—the little city where the Falcon is to be manufactured. The road is said to be impossible even to horse and buggy and no cars so far, it is stated, have ever climbed the grade. The road was made at the time of the Civil war to take cannons to the top of the mountain to protect Staunton, and has not been used as a road since, but more as a footpath by sightseers and picnickers.

It is by such demonstrations as this and heavy tests that the really live cyclecar firms are not only showing the public what the cars will do, but proving to themselves and their engineers the strength and weaknesses of their cyclecar constructions.

#### NEW ONE FROM MINNESOTA

The Pridemore cyclecar designed by W. A. Pridemore, of the Pridemore Machine Works, Northfield, Minn., is the latest announcement. It has foreign lines with a positive drive instead of belts. Friction transmission is employed with final drive by chains to the rear wheels, with a differential in the jackshaft. The chassis weighs 450 pounds and the car complete 600 pounds. The car is made tandem seat, roadster side-by-side seat, and delivery type.

A twin-cylinder, air-cooled motor is



SNOWSTORM GIVES STRENUOUS TEST FOR FALCON CYCLECAR

used, 12 to 14 horsepower. Wheelbase is 100 inches and tread 40 inches. The tires,  $2\frac{1}{2}$  by 28 inches, are carried on wire wheels, with brakes acting on 8-inch drums on the rear wheels. The steering is by pinion and sector and the controls are on the cowlboard. The frame is channel steel, braced rigidly and is underslung, with a clearance of 9 inches. The axles are seamless steel tubular type with forged steel knuckles. F. W. Skinner has charge of the sales.

#### HOUK CYCLECAR WIRE WHEEL

The Houk Wheel Co., is making a new type of wheel for light cars, shown in the drawing, Fig. 1. This wheel is detachable and of the triple-lace wire type. It is furnished either with or without brake drum and is intended to take 28 by 3 tires. For cars which need tires of this size and firms which prefer the quick-detachable wheels for these vehicles, these wheels should fit into a new field.

## Answers to Cyclecar Inquiries

#### THINKS DIFFERENTIAL NOT NEEDED

Cites Experience with Narrow-Tread Cars in Actual Service.

**D**ETROIT, Mich.—Editor Motor Age—I have been out in a differential-less chain drive cyclecar with a rigid rear axle driving both wheels solid, and have been surprised how true have been the predictions that a differential was unnecessary on a 36-inch tread. I have made turns in an ordinary street without feeling a drag, and on the road and rough spots the feeling of security was found ideal.

The car is a shaft drive experimental machine not yet announced, having a friction lay-out back of the rear seat and driving from the friction jackshaft to the rigid rear axle. The action of this differential-less axle was the surprise.

Belt drive has proved itself so far as differential action was concerned when small pulleys were used, but when larger were fitted the action was found to be much like a stiff axle, yet there was no disadvantage but rather an advantage. Since there was found to be no need for a differential on a 36-inch car the rigid axle system was tried by two concerns and

has been found a complete success. This probably will have considerable effect on the development of next year's models.

During this test the car took street corners fast and slow, short and wide, on rough spots and wet pavements. Later it was turned about in the width of the narrow street without reversing, and yet gave no sign of extra power. What tire slippage there may have been theoretically was not noticeable. What the effect on tires will be cannot be determined until months of running has been done, but the difference in wear will be more than made up no doubt—if there is any—by the lessened cost and greater trouble and road instability that would be present with a differential.

There is no real need for a differential on a 36-inch tread cyclecar.—M. V. L.

#### Rotary Motor Gasoline Feed

Indianapolis, Ind.—Editor Motor Age—Kindly explain how gasoline is fed to a rotary motor, such as is used in some aeroplanes.—J. Nadin.

The gasoline is fed to the rotating Gnome motors, as used in aviation work through the stationary crankshaft, which is built hollow. The pistons of this motor are of special construction connecting to the single crank a radiating connecting

rod. The intake valve for each cylinder is in the piston head, while the exhaust is in the cylinder head.

The gas therefore is sucked through the crankshaft into the crankcase, where it is mixed with the oil through the churning of the motor parts and then on the suction-stroke passes through the piston inlet valve into the cylinder. These motors are not successful with ordinary cylinder oil which mixes with the gasoline and spoils the mixture as far as firing strength is concerned so that these motors are lubricated entirely with castor oil which will not mix with gasoline but stays free throughout the operation of the motor without affecting the mixture.

#### CYLINDER VOLUME OF CYCLECAR Cubical Contents and Flywheel Weight are Calculated

Muncie, Ind.—Editor Motor Age—What should be the cubical contents of the combustion chamber of a V-shaped, air-cooled, four-cycle motor, with  $3\frac{3}{8}$  by 3 15-16-inch bore and stroke?

—What should the flywheel weigh? About 65 pounds of compression is desired. Flywheel is not to be over 11 inches in diameter.—N. K. Schwarr.

1—To predetermine a compression without knowing the design and shape of the combustion chamber is almost impossible, and even when this is known is more or less guess. Of the entire cylinder and combustion volume combined, about one-fourth should be combustion chamber and three-fourths the swept cylinder volume for the compression you need. The combustion space can be a trifle smaller but that given is about right.

2—Flywheel weight depends on the rim shape and diameter and the smoothness of running you require. Would suggest a rim 2 inches wide and  $1\frac{1}{2}$  inches deep for 11-inch wheel on this motor.



FIG. 1  
HOUCK WHEEL FOR  
LIGHT CARS



# The Realm of The Commercial Car



## Saurer Brings Out Special Design for Colonial Service

**A**D. SAURER, Arbon, Switzerland, has brought out a special type of colonial or emigrants' car, designed with a view to utilizing the economical advantages of motor trucks even in impracticable countries where the roads offer great difficulties to horse-drawn vehicles. The chassis are equipped with a four-cylinder motor of an effective output of 30, 36 or, in exceptional cases, 45 horsepower at the brake, at 1,000 r. p. m. The gas mixture is formed in a Saurer carburetor, comprising two nozzles and automatic control of the air supply.

### Supplementary Radiator Installed

In tropical countries a special supplementary radiator, made up of a water tank fitted to the dash board in front of the driver's seat, is arranged on the chassis, beside the ribbed radiator and fan, and conveys cooling water to the motor through serpentine finned pipe on the frame. The frame of the colonial chassis is especially substantial and is reinforced by four cross-beams.

The chassis comprises three self-contained brakes, working in a forward as well as backward direction, viz., the gear pedal brake, the rear wheel hand brake and the Saurer patented motor brake, actuated through a gas lever from the steering wheel. So far from being a friction brake, the motor brake generates the braking resistance by the compression of atmospheric air in the motor, i. e., without any wear of the gearing parts and rubber tires. Its braking effect is adjustable within wide limits, thus allowing any gradient to be negotiated with the sole use of the motor brake. The colonial chassis is equipped with extra high and broad wheels destined to insure a ready advance even on a ground devoid of roads.

Full rubber tires generally are used, iron tires being of advantage only in exceptional cases. If the vehicle be destined, for instance, to travel on recently-balanced roads, iron tires could be used temporarily to roll the ballast into the road. Again, in sandy countries, where traveling speeds are not high, iron-tired wheels can be used during the dry season. During the rainy season, iron tires, however, cannot be used, owing to the absence of sufficient adhesion on slippery, wet soil. In tropical countries, where there are protracted rainy periods, rubber-tired wheels should be used exclusively, the adhesion of which on slippery roads can be increased considerably by open-link chains.

In special cases, the rear wheels are supplied with rope drums allowing the vehicle to be got out of difficult positions. Locking of the rear-wheel differential drive is provided for this purpose. A cable winch driven by the motor can also be provided at the rear end of the chassis, to wind the car out of difficult positions in a backward direction or to haul another vehicle out of a bad spot.

### Special Bodies Fitted

Bodies are adapted to the use of the vehicle. In agricultural work, for the conveyance of hay, etc., an ordinary platform or bridge body may be preferable. The economic efficiency of the colonial car in transporting bulk goods, such as sand, stone, coal, ores, etc., may be increased by the use of a tipping loading bridge, designed to be operated either by hand or by the car motor, the load being discharged automatically by tipping the bridge in a backward direction as well as to both sides of the truck.

The combined passenger and material car serves a double purpose, its longitudinal benches being designed to be folded down,

thus producing a standard load truck body, or with the benches up, becomes a passenger bus.

### MINNEAPOLIS' GARAGE SCHEME

The Commercial Garage Co. of Minneapolis, capitalized at \$50,000, will make a move calculated to improve the trade in trucks of all makes. It plans to take off the hands of corporations and private owners the entire supervision, care and repair of machines, as well as details of maintenance and also the supervision and education of drivers where drivers' inefficiency tends to raise the overhead truck expense. It will centralize the care of motor trucks in a big, two-story, brick and concrete building with shop for repair work, painting, wheelwright and blacksmith operations. The business will be in charge of skilled men 24 hours a day.

The company will keep all truck parts and supply gas and oils at current rates. Co-operation has been had with the manufacturers of trucks and tire agencies. Trucks left with the garage company will be inspected at night, repairs made, tires patched and bolts tightened up. Drivers who fail to make good will be given a chance to improve by watching the "shopping" of their machines and by attending talks in the chauffeurs' quarters by skilled mechanics and drivers. Delivery routes will be laid out for the men to make distances in the shortest possible time.

### Emergency Service Provided

Emergency cars will be maintained to go after cars that need help and extra commercial machines will be leased at low rates. Through connection with A. D. T. service fires will be reported at once and pick-up machines will be sent out for employes of firms whose property is involved in case they are patrons of the garage.

One hundred cars can be taken care of, but a minimum of fifty has been declared at first. Sixty feet of ground has been reserved for expansion. The company plan has been organized by Dr. James L. Kelly, of the truck department of Bowman & Libby, Inc., Overland branch.



Two features of Saurer Colonial cars: At the left, hub winch by which car pulls itself out of holes; at right, extra radiating pipes on frame for hot countries



Other officers of the new concern are: Vice-president, Frank Bowman; secretary-manager, S. W. Eddy; treasurer, W. C. Decker.

#### WAR CAR FOR PANCHO VILLA

Juarez, Mexico, Feb. 20—An armor plated motor car, fully equipped with machine guns and other implements of war, has just been completed at the shops of the Mexican Northwestern railroad in Juarez and will be used by the constitutionalists in their campaign in the interior of Mexico, particularly for the planned attack on Torreon. The machine is in reality a small land gunboat, being equipped with seven machine guns and protected on all sides by steel plate. Even the spokes and wheels are covered, steel protectors being built over the sides of the wheels to prevent injury in dynamite mine explosions. The machinery of the car is protected from damage from this source by a steel plate covering the bottom of the car.

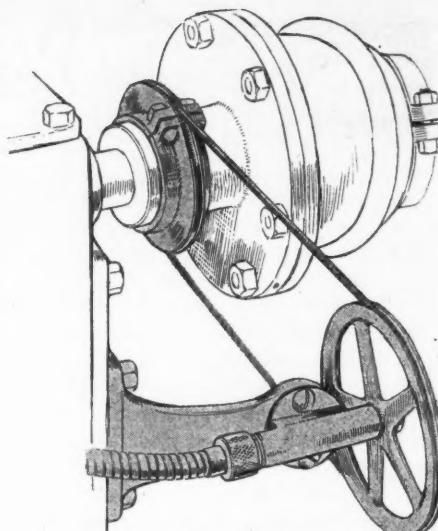
The car is about 20 feet long, 6 feet wide and 8 feet high. It was built on the chassis of a Saurer-Mack truck. It can be operated either on railroad tracks, ordinary roads, or be run across fields if necessary. When it is desired to run the

car on railroad tracks, the heavy tires used on the road are taken off and a special set of flanges attached to the wheels. It is stated that a speed of 40 miles an hour can be attained on the rails, while 20 miles is the maximum on an ordinary road. The war machine also carries a wireless apparatus and a powerful revolving searchlight on the top of the car, which will prove a great aid in locating the enemy. The car can carry enough gasoline to operate it for 200 miles.

It is stated that tests have been made of the steel casing protecting the car, which proved it to be impenetrable by Mauser or machine guns. The sides are protected by two hulls of steel plate, with four layers of felt between them. In addition to this protection, the operators of the machine guns will be protected in an engagement by the steel roof. General Pancho Villa is said to be planning to build a number of cars of similar design.

#### VAN SICKLEN SPEEDOMETER DRIVE

On this page is illustrated the method by which the Van Sicklen speedometers are driven from the propeller shaft of the Apperson cars. These speedometers are stock equipment on the 1914 Appersons and operate on the pneumatic principle.



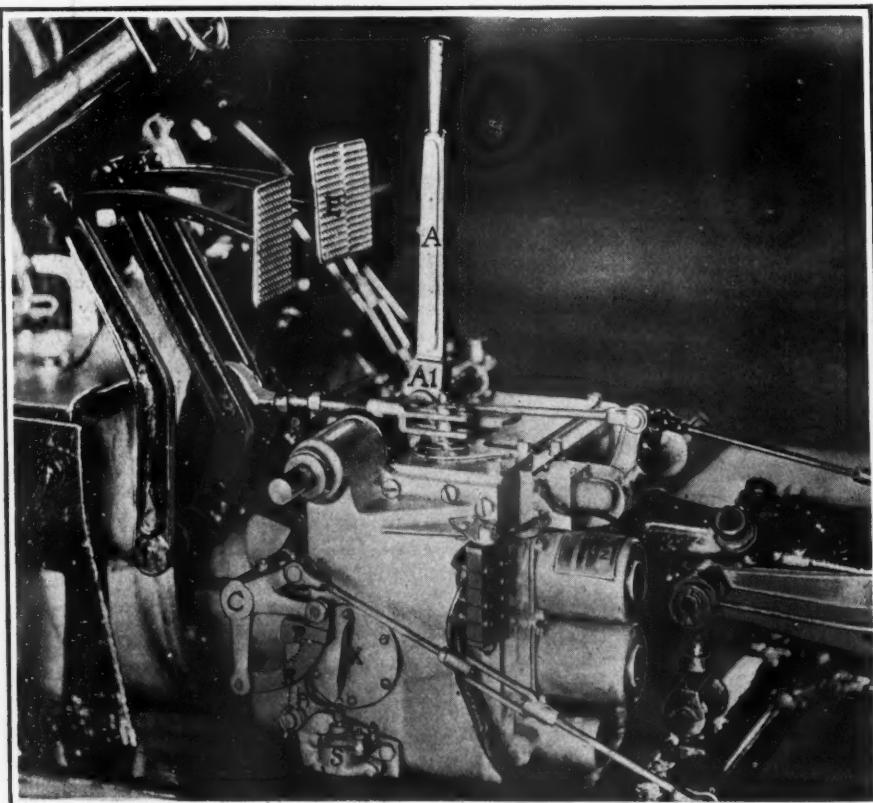
VAN SICKLEN SPEEDOMETER DRIVE ON APPERSON

The Norwalk car, fitted with this device, has two brake pedals, the emergency pedal being shown as E in the illustration herewith. The ordinary foot brake pedal is set close to this, so that both may be depressed at once or each one operated separately. The emergency brake is connected to a short cross shaft C on the end of which is a quadrant which incorporates the brake rack R. Engaging with this rack is a pawl P mounted on the bell crank B. When current is sent through the coils of a solenoid S the pawl is pulled into engagement with the rack. The locking of the rack then causes the brakes to be locked, the operation being accomplished by pressing the pedal E and touching a button under the steering wheel. This causes the pedal to remain down until further pressure is applied. The latter movement will cause the release of the pawl, which is held out by a small spring X in the illustration.

## Norwalk Adopts Electric Brake Lock

A N emergency brake which is operated by electricity and which locks the brakes is now incorporated in Norwalk cars made by the Norwalk Motor Car Co., Martinsburg, W. Va. The electric brake lock,

as it is called, does away with the conventional emergency or hand brake lever and prevents the brake being released by anyone except the man at the wheel. A solenoid does the work.



DETAILS OF THE NORWALK ELECTRIC BRAKE LOCK

#### INDIANAPOLIS HAS CITY GARAGE

Indianapolis, Ind., Feb. 20—The city recently opened a municipal garage, the first, it is believed, in Indiana, and one of the few in the middle west. The board of public works, which will have control of the garage, believes it will save the city thousands of dollars annually.

The garage has been erected in the rear of the new fire headquarters building and will be used to house all city motor cars, except those in the police and fire departments, at night and on Sunday. The garage building cost \$9,000.

#### WILLYS SEEKS COAST PLANT SITE

Los Angeles, Cal., Feb. 21—Special telegram—John N. Willys, president of Willys-Overland Co. of Toledo, O., is now in Los Angeles and it is reported that he is looking for a site on which to build a plant where cars for consumption on the Pacific coast will be built. Los Angeles and El Paso, Tex., are the two cities he is said to be considering for the site of such a factory.



In the preliminary steps given in this department last week, the crankshaft was in an upright position on the work bench and the connecting rod bearings were given their first fitting. It is best to work with one rod at a time. One should be fitted perfectly before the next is started. The crankshaft has been rubbed with a little lamp black and the rod worked in. The rod is removed then and the bearing examined. Little black spots will be seen on the surface of the bearing after the bearing has been rubbed with a clean cloth. If no black spots appear it is evidence that the bearing is not touching the crankshaft at any point.

If the rod was found not to fit snugly when the initial fitting was given, then the shims should first be filed. The shims are those pieces of metal which rest between the two halves of the connecting rod bearing. A filing block should be made. A block of wood is used for this. The block should be gouged on its surface so that the resulting shape resembles the shim. That is, cut two holes out of the wooden block into which the shims will fit. They need not fit perfectly. These indentations should not be too deep, for a little of the shims must protrude above the top of the block.

It is essential that both cuts in the block be of the same depth. The shims are placed then into these grooves and they are ready for filing. A fine mill file should be run over the surface of the shims by holding the file at M and N, as shown in Fig. 1. Do not file much. The object of filing the shims is to bring the bearing halves closer together. The bearing was not touching the shaft, so by bringing the halves of the bearing together a little, the bearing is made to touch. It will be seen here that accurate shim filing is essential. The shims should be perfectly level, and as the illustration shows, filed in pairs.

With the shims filed, place them in position and give the bearing another fitting. The rod should fit tightly, that is, some effort should be required to push it around.

Taking for granted that the rod has been given a fitting and that it has been examined and found to contain a number of little black spots as shown at the right the scraping will be begun. For this operation a device called a bearing scraper is used. This may be procured at any supply store. The scraper is held as shown in the illustration. However, one may be accustomed to scraping and can handle the scraper better in another position. One very important point must be borne in mind and that is that the word scraping does not mean, as it usually does—scratching. Scratching is detrimental to the

## Scraping In Motor Bearings

### Actual Operation

#### Part II

bearing. By scraping is meant cutting from the surface of the bearing a very thin shaving of metal and at the same time leaving the surface of the bearing smooth.

#### Actual Scraping

The real object of scraping is to get the bearing to touch the crankshaft at every point, and still not cause binding. That is a hard condition to get, so we get it to touch as nearly as possible at every point. A bearing may be said to be a good one if every  $\frac{1}{2}$  inch on the surface of the bearing touches the crankshaft. It will be supposed in this article that the bearing needs scraping. It does not show little black spots every  $\frac{1}{2}$  inch. Instead there are a group of spots at one end and another group at the other. This condition is shown at G and E in Fig. 1. This means that the center portion F is not touching the shaft at all. The object now is to make the center portion touch and at the same time make G and E touch.

All the little black spots are scraped off, one at a time, or nearly so. Short, clean strokes should be made with the scraper and care taken not to roughen the surface of the bearing. The scraper should be moved sideways and at the same time a little forward. It will be found that but one hand is necessary to manipulate the scraper, but that the other is needed to guide the tool.

After all the black spots have been removed the bearing is thoroughly cleaned

with a cloth. The crankshaft is again blackened with lampblack and the rod given another fitting. If at this fitting the rod is loose due to the bearing having been scraped too much, the shims should be filed a little. After the rod has been turned on the crankshaft for about 2 minutes, it should be removed and the bearing again examined.

Little black spots will again be seen, but this time more, if the bearing was scraped properly before. If the entire surface of the bearing contains black spots about  $\frac{1}{2}$  inch apart then the bearing is in good condition. But this holds true only if the rod fits snugly on the shaft. If the black spots are again grouped as shown at E and G, then the individual spot scraping is repeated. In the illustration the bearing is shown as being low at F and high at G and E. The object is to get G and E as low as F. This is done by scraping the spots. The operation of scraping the spots is repeated until the rod gives a snug fit and at the same time has the bearing touching uniformly. If it bears at every point but is loose on the shaft, then the shims are filed and the scraping operation repeated.

#### Motors That Overheat

Some motorists are at a loss to understand why overheating should occur, at this time of the year. A thing to be watched is the water used in the system. In some localities, the water contains salts of various kinds which deposit on the walls of the cylinder jackets. The scale deposits prevent the proper dissipation of the heat and when the scale is deposited in the radiator the condition is aggravated.

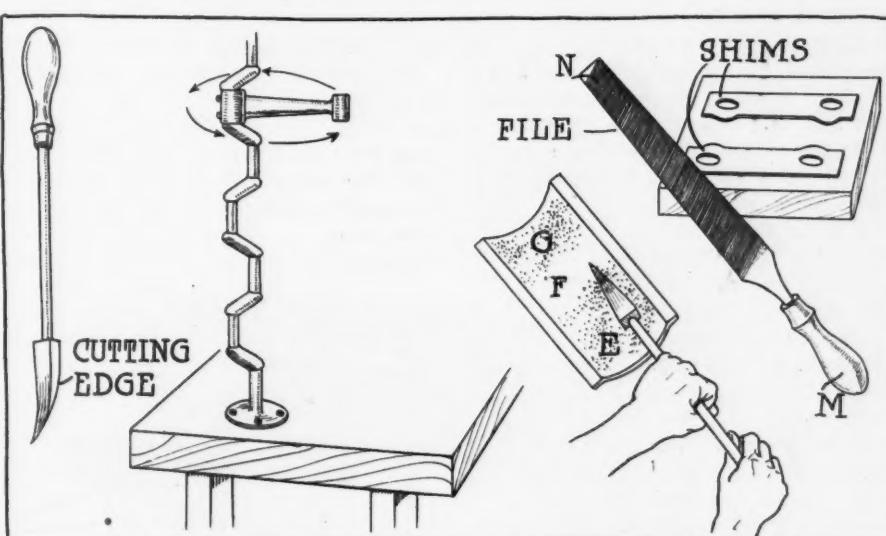


FIG. 1—ONE METHOD OF SCRAPING BEARINGS

*At the extreme left is shown a common form of scraping tool. The next illustration shows the method of working-in the rod bearing, while the third shows the usual way of holding the scraper and the appearance of the bearing after being worked-in. At the extreme right the shims are shown on a block ready for filing*

# The Accessory Corner

## Critchley Expanding Reamer

A REAMER which has a wide range of adjustment is being offered by Chadwick & Trefethen, Portsmouth, N. H. The body of this reamer, shown in Fig. 1 at 1, has 5 grooves fitted with cutters. The cutters are beveled, fit in tapered grooves and are held in their places by nuts so that it is necessary only to slide the cutters up or down in their grooves to increase or decrease the outside diameter. The cutting range for the 00 size is from  $\frac{3}{8}$  to  $\frac{1}{2}$  inch and for the No. 12 from  $3\frac{1}{16}$  to  $4\frac{1}{8}$  inches, intermediate sizes being provided also. The smallest size, the 00, sells for \$4.50 and the largest, the No. 12, for \$24.

## Sallander Truss Rod Straddler

The Sallander Mfg. Co., Fort Madison, Ia., is offering the Sallander Truss Rod Straddler, a device which enables cars fitted with truss rods at the rear to be jacked up easily and quickly and eliminates the possibilities of the car rolling off the jack. The straddler is shown in Fig. 1 at 3, fitted to the rear axle housing of a car. The Sallander sells for \$1.

## Vails Carbon Scraper

A new type of carbon scraper is being marketed by the Steele & Collins Co., Los Angeles, Cal., with which it is possible, it is claimed, to scrape the carbon from every portion of the combustion chamber and from the piston top. The Vail, shown in Fig. 1 at 4, has a two-part end which may be expanded by pulling a trigger. After scraping has been done a kerosene mop may be placed at the end of the scraper and the small carbon particles removed.

## Superior Overhead Vehicle Washer

A combination overhead vehicle washer and light cluster which is adjustable at the water joint for wear, is being marketed by the Vehicle Specialty Co., Hartford, Conn. This washer, shown in Fig. 1 at 2 is attached to the ceiling above the wash rack and throws the light upon the car to be washed. The washer sells for \$35 with the lighting attachment. The plain washer sells for \$15.

## Rohe Motor Car Block

A device for pulling a motor car out of a mud hole under its own power is announced by the Rohe Traction Block Co., Kenmar, N. D. The block, which is 30 inches long, is placed as shown in Fig. 9 with a chain attached to the wheel by a strap. When the wheel revolves it draws the chain and block under it, thus affording a tractive surface.

## Sherwood Trailer

The Sherwood Bros. Mfg. Co., Canasota, N. Y., is offering a trailer which may be attached to any make of motor car and is

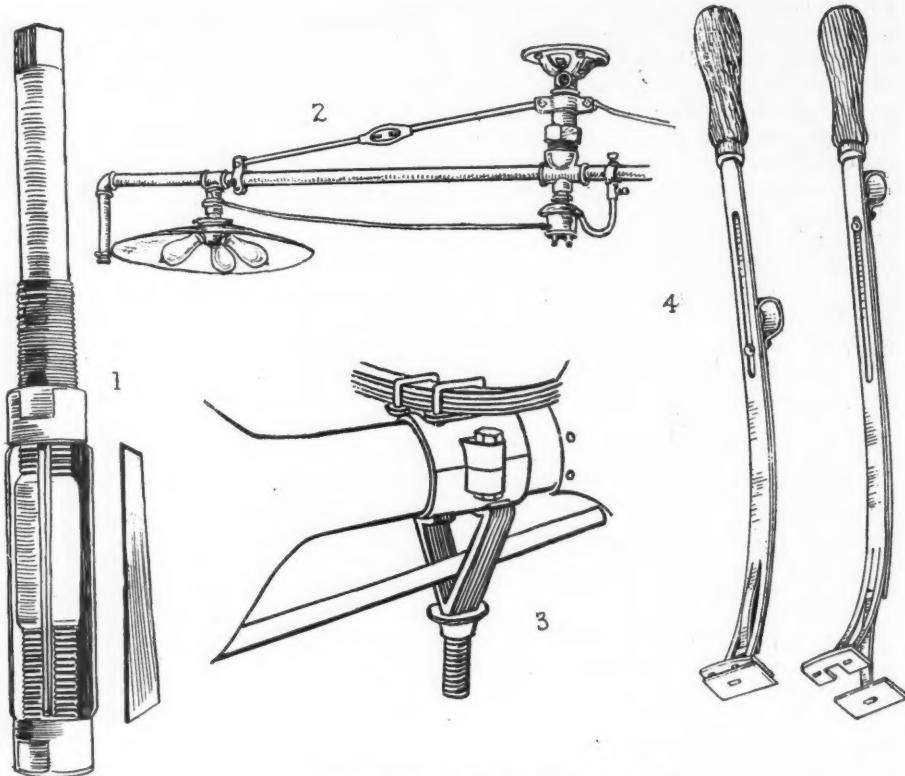


FIG. 1—A FEW HANDY SHOP TOOLS

1—Critchley expanding reamer which has tapered cutters as shown; 2—Superior overhead vehicle washer which is adjustable at the water joint for wear; 3—Sallander truss rod straddler attached to the rear axle housing; 4—Vails carbon scraper which reaches every part of the combustion chamber

especially adapted for Ford. The trailer is a two-wheeled, rubber-tired affair with a capacity of 600 pounds, and is equipped with Timken axles and bearings. The trailer, shown in Fig. 2, weighs 300 pounds. Connection of trailer may be made in 1 minute, it is claimed. The price of the trailer to the trade is \$50.

## Dayton Decarbonizing Plant

The Stop A Leak Mfg. Co., Dayton, O., is marketing an outfit which may be used for welding and also for removing carbon from the cylinders and also offers carbon-removing outfits separately. The former set sells for \$105, which includes welding torch, reducing valves, oxygen tank, etc. The complete carbon-removing outfit sells

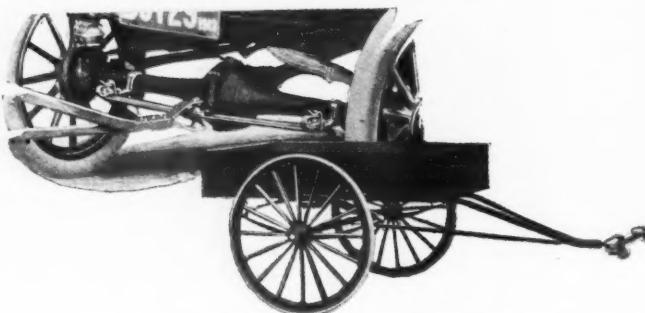


FIG. 2—SHERWOOD TRAILER FOR MOTOR CARS  
Showing also the method of attachment at the rear of a Ford

for \$55, including a full tank of oxygen.

## Bray Acetylene Burner

A foreign-made acetylene burner, known as the Bray and handled in America by the W. M. Crane Co., New York, is said to completely burn all gas at the end of the burner, giving better efficiency and longer life to the burner. The feature of the Bray, shown in Fig. 3 at 5, is the slot A, which admits air at the orifice. The burner itself is indestructible, it is claimed.

## B. & W. Motor Car Lock

A lock which holds the crankhandle rigidly to the front axle of a car is announced by the Universal Mfg. Co., Racine, Wis. The lock consists of a hinged link fastened to a clamp attached to the front axle as shown in Fig. 3 at 4. The link has a hole at its end which may register with a hole in the clamp. When this is done the arm, if a lock is inserted into the hole, holds the parts fast. The B. & W. is especially applicable to Fords but may be used on many other makes of cars. It sells for \$1.50.

## Phinney-Walker Clock

Clocks which are wound by turning the outer rim are marketed by the Phinney-Walker Keyless Clock Co., New York, in

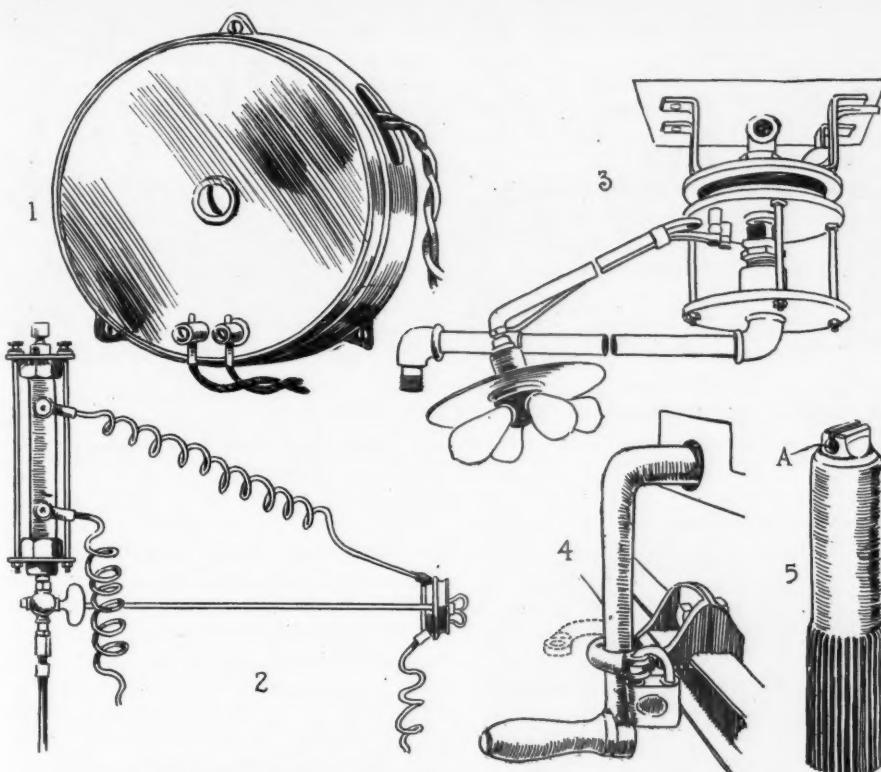


FIG. 3—INTERESTING ACCESSORIES RECENTLY ANNOUNCED

1—Automatic cord winder which keeps lamp cord attached to trouble lights, etc., wound, except when in use; 2—Duelec vaporizing primer, a device which passes vaporized fuel to the intake manifold by the turning of a handle; 3—Irving overhead vehicle washer; 4—B & W crankhandle lock for motor cars; 5—Bray burner showing air passage A

a number of different styles. One type, especially adapted to cowl dashes, is shown in Fig. 6. This clock has a countersink which projects just far enough from the dash to permit the clock to be wound.

#### Automatic Cord Winder

The long lamp cords attached to trouble lamps or cigar lighters sometimes are in the way and to keep the cord in a small space when not in use the Metal Specialties Mfg. Co., Chicago, has introduced the Automatic Cord Winder, shown in Fig. 3 at 1. Four leads are shown, two of which are attached to the current source and the other two to the trouble lamp or cigar light as the case may be. The device automatically winds up the cord as a roller winds up a window shade. It may be attached in any part of the car. The winder sells for \$2.50.

#### Duelec Vaporizing Primer

A device which passes vaporized fuel to the intake manifold by the turning of

a switch is announced by the Duelec Vaporizing Primer Co., Yonkers, N. Y. This apparatus vaporizes the gasoline, or kerosene by the use of electricity. By turning a switch on the dash the fuel is made to enter a chamber containing a coil of wire through which current from a battery is flowing. The heat of the current vaporizes the fuel which passes to the cylinders. Turning off the switch discontinues the flow of current and prevents fuel from entering the chamber. The Duelec, shown in Fig. 3 at 2, sells for \$5.

#### Ward Leonard Nodaz Lamp

This device made by the Ward Leonard Electric Co., Bronxville, N. Y., meets the demands of the motor car drivers in regard to headlights. It consists of two pairs of translucent wings mounted on pivots fastened in the headlight reflector. These wings are made to open and close by electromagnets inside the cover of the lamp itself. When running in the city the wings are closed simply by pressing a push button conveniently located on the dash, or other part of the car. When the wings are closed, there is no glare, but the road near the car is flooded with strong, diffused light, a fact which makes the Nodaz particularly valuable when rounding sharp curves. At any moment when it is desired to use the full illumination of the lamp it is only necessary to push another button which opens the wings.

When in the folded or open position, the wings do not perceptibly affect the light given off by the lamps. The electro-magnetic control is convenient, and it takes

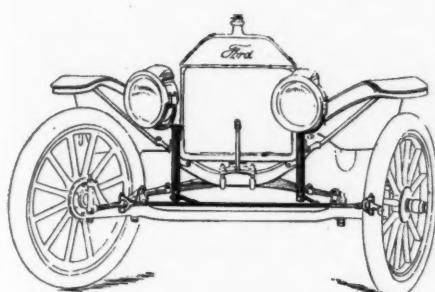


FIG. 4—TURNING HEADLIGHT SUPPORT  
This device may be attached to old cars and uses the old lamps

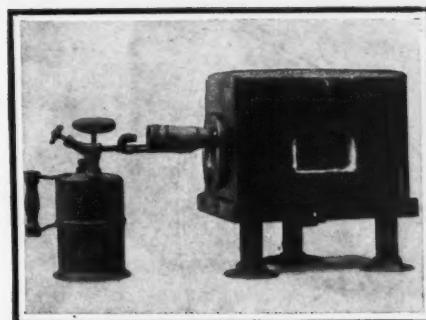


FIG. 5—HAUCK KEROSENE TORCH  
The flame may be regulated to 14 inches

only a small current from the battery just at the moment when the wings are either opening or closing.

A great advantage of the Nodaz device is that it may be attached to practically any headlight now in use at small cost, and requires no knowledge of electricity to assure its constant and satisfactory operation in service.

#### Hauck Kerosene Torch

A torch for use in almost any heating operation and also is adaptable in connection with small annealing and tempering furnaces is announced by the Hauck Mfg. Co., Brooklyn, N. Y. The maker claims unusual performances for this torch, stating that it is capable of melting a piece of copper  $\frac{1}{2}$  by  $\frac{1}{4}$  inch in 3 minutes and heating to redness a piece of 2-inch steel in 5 minutes. The flame may be regulated to 14 inches. The maker of the torch is marketing also a compound particularly suitable for brazing cast iron and steel. The torch is illustrated in Fig. 5.

#### Irving Overhead Washer

The I. J. Smith Mfg. Co., Brooklyn, N. Y., is marketing overhead vehicle washers in both the plain and combination types. The latter which incorporates a lighting cluster is shown in Fig. 3 at 3. The lighting wires are placed in a waterproof conduit to prevent short circuiting. The revolving arm is 5 feet long. One of the plain types sells for \$55.

#### Pioneer Painting Outfit

The Northwestern Chemical Co., Marietta, O., is marketing a painting outfit suitable for Ford and other small cars. This outfit is offered with a choice of six colors at \$5.75 and when both chassis and

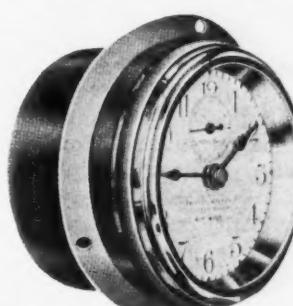


FIG. 6—PHINNEY-WALKER CLOCK  
This cowl-type keyless instrument is wound by turning the rim

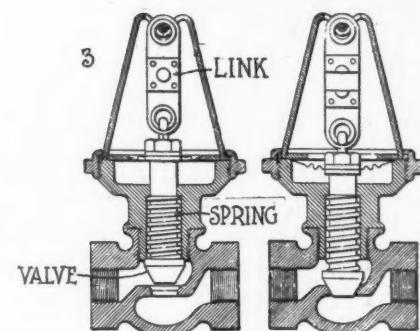
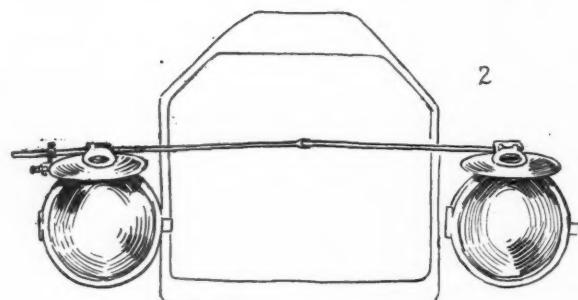
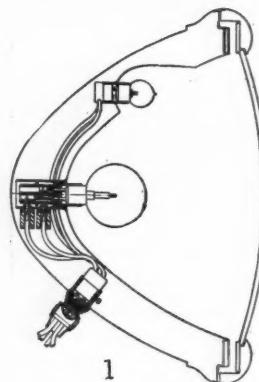


FIG. 7—THREE SAFETY FIRST DEVICES BROUGHT OUT RECENTLY

1—New Hall headlight with small bulb incorporated. The small bulb as will be noted has its own reflector; 2—Pfahler headlight shutter which covers the headlights when a pedal is pressed. A small red light is fitted in the shutter; 3—Underwriter Automatic valve which when placed in the gasoline line shuts off the supply of fuel in case of fire

body are to be painted black, at \$5. The Pioneer contains everything necessary to paint the car and with each set instruction sheets are given which will enable the owner to do the work satisfactorily.

#### Arsenal Painting Outfits

The Arsenal Varnish Co., Rock Island, Ill., is marketing painting materials for all types of cars, including a special outfit for Ford cars which, with the book of instruction given, is sufficient to enable the owner or driver to give the car a new finish. The Arsenal company also is offering top dressings and special hood and fender outfits, in fact everything to keep the car looking well. The Ford set sells for \$6.50.

#### Deaco-Ford Starting and Lighting System

A simple starting and lighting system for Ford cars is announced by the Detroit Electric Appliance Co., Detroit, Mich., which the owner of the car may himself install. A motor-generator driven by silent chain as shown in Fig. 8 supplies the current when the car is operating at sufficient speed, but at low speeds, or when the motor is stopped a battery attached to the running board furnishes the current. Pressure of the heel upon a pedal sends current from the battery to the starting motor which in turn cranks the engine. All the terminals are marked in some way and the wires cut to exact size, so that if the instructions are followed the installation becomes a simple matter.

#### Spark-No Lock

The Swyers & Lorch Mfg. Co., Pittsburgh, Pa., announces a unique lock for motor cars which is controlled by a combination and which secures the ignition wires of the motor. Should anyone attempt to start the car with the lock set, a bell will ring and give warning that someone is tampering with the car. The combination for starting is different from the running combination. The reason for this is that anyone not knowing the running combination will be at a loss to start the car.

#### National Pump

As announced, the National Motor Supply Co., Cleve-

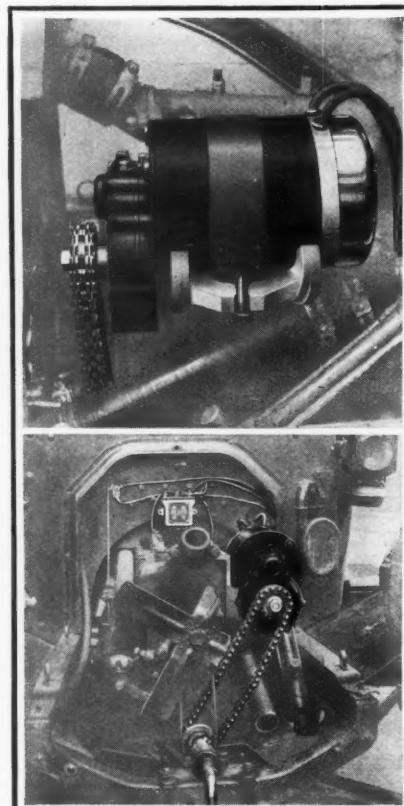
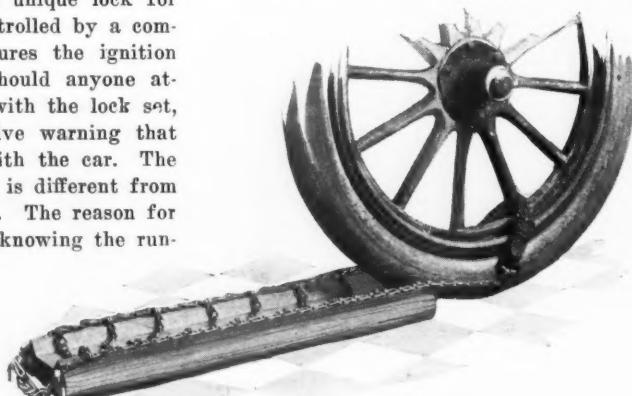


FIG. 8—DEACO-FORD CRANKING AND LIGHTING SYSTEM

land, O., has just placed on the market a new pump of the spark-plug type, which they call the Telescope pump. The body

FIG. 9—ROHE MOTOR CAR BLOCK  
Designed to enable a car to pull itself out of a mud hole

is made of cylinder iron, carefully machined inside. A floating piston containing metal piston ring has a brass tube attached to its upper side. As the piston in the engine cylinder moves up and down, the compression and suction moves the piston in pump in like manner, causing the brass tube or piston stem to slide in and out at the top of the pump. The compression chamber is between the walls of the brass tube and outside body. As the piston goes downward, the fresh air is drawn in through the piston and enters the compression chamber. The new pump is 5 inches high and sells for \$8.50.

#### Smith Lever Locks

Joseph N. Smith & Co., Detroit, Mich., are offering a line of lever locks, one type of which is a departure from the usual form of spring latch lock, in that a steel coil spring is used in place of a flat brass spring. The lock is of cold rolled steel throughout and sells for 75 cents per pair without knob or plate.

#### Chemico Blowout Patch

The Atlas Auto Supply Co., Chicago, announces the Chemico blowout patch, which is designed to make a blown-out easing serviceable, for a time at least. It is made of heavy fabric and is placed inside of the easing directly under the injured portion of the easing. The patch comes in four sizes, ranging in price from 50 cents to \$2.

#### Dimit Headlight Control

A small instrument designed to dim or brighten the headlights and which may be installed on any make of car by the owner is announced by the Suburban Lighting and Gas Engine Co., Toledo, O., under the name of Dimit. The device itself may be placed on the dash and is controlled by hand. The face of the instrument is fitted with a switch and various notches so that the headlights may be operated at full voltage or at intermediate pressure. It is especially applicable to Ford cars and sells for \$2.50.

#### Brunner Air Compressors

The Brunner Mfg. Co., Utica, N. Y., is offering a line of air compressors for garage use in two types, one to be operated by belt by a gas engine and the other

operated by electric motor directly. The line is indeed complete, comprising compressors of from \$18 to \$385 and in various styles for every garage purpose. The portable motor-driven type designed for use in small garages is mounted on an iron truck and can be wheeled into position in any part of the garage. It is equipped with an electric motor and wire and socket and may be operated from the lighting circuit.

With a tank pressure of 160 pounds it will inflate four 34 by 4-inch tires to 75 pounds.  
**Ford Lighting Outfit**

The Fitzgerald Mfg. Co., Torrington, Conn., announces a magneto lighting system for Ford cars which consists of two stamped brass reflectors, a hand switch, two sockets, cable and a roll of tape. The maker issues instructions with the outfit so that any owner may install the system

himself. The lamps are made to operate in series at 6 volts and give 12 to 16 candlepower.

#### Diamond Electric Meter

A meter which indicates both voltage and amperage for both dry cells and storage batteries is announced by Charles E. Miller, New York. There are three terminals, one for voltage, one for current and a common terminal.

## Numerous Safety First Devices for the Motorist

#### Underwriter Automatic Valve

A VALVE, which when placed in the gasoline line of a motor car automatically shuts off the fuel supply in case of fire, is announced by the Underwriter Valve Co., Providence, R. I. Either direct flame or extreme heat caused by fire will melt a link on the valve and cause the fuel supply to be shut off. In Fig. 7 at 3 are shown two views of the Underwriter valve, the one at the left illustrating the valve open. As soon as heat is applied the fusible link melts and causes the valve to be pushed into its seat by the force of a spring as shown at the right. The valve may again be placed in service after the link has melted by applying a new link or by holding the valve open with a piece of wire. The valve itself is made of bronze, copper and German silver and is applicable to any system carrying combustible liquids. It sells for \$5.

#### Linquist Automatic Fender and Brake

A fender which is applicable to any type of vehicle, it is claimed, and which stops the motor and applies the brakes as soon as the fender is struck is announced by Wm. A. Linquist, Minneapolis, Minn. The fender is operated by foot pedal and may be raised as high as desired within limits and as low as 1 inch from the ground. The fender shown in Fig. 10 at 3 is raised and lowered vertically and when struck applies the brakes and stops the motor without any movement of the driver. It extends 13 inches in front of the car to which it is applied.

#### Rohrer Safety Crank

The R. & B. Mfg. Co., Philadelphia, Pa., is marketing a crank for motor cars which is said to prevent injury to the person cranking a car in the event of the engine reversal due to backfiring. The crank, shown in Fig. 10 at 2, is attached to the crankshaft end at C and should the motor reverse only the portion C turns, leaving the rest of the crank stationary. Another feature of the Rohrer is that pressure on the lever G holds the crank in a given position. The safety crank sells for \$15.

#### Scaife Storage Outfit

A simple storage outfit for private garages is being marketed by the Wm. B. Scaife & Sons Co., Pittsburgh, Pa. The system is especially adapted to garages where the car is kept in one corner and the gasoline in the opposite corner as shown in Fig. 10 at 1, and where the tank

is some distance from the garage. The parts of the apparatus have been approved by the National Board of Fire Underwriters, according to the maker. Tank capacities of from 60 to 1,000 gallons are offered. The prices of the outfits run from \$34.50 to \$236.

#### New Hall Headlight

The latest development in Hall lamps is that shown in Fig. 7 at 1 which employs two bulbs, one an auxiliary, contained in a separate reflector. The small bulb supplies low-candlepower light for city use and the larger lamp sufficient light for country work. The headlight sells for \$5.

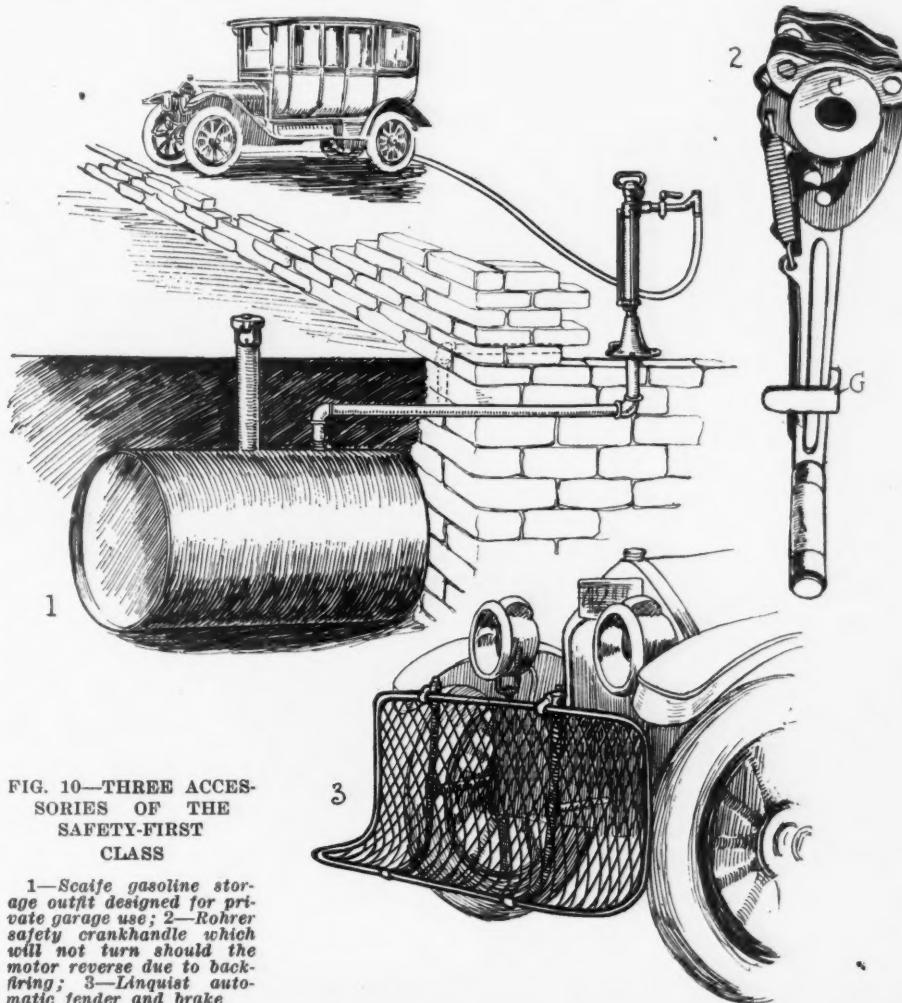
#### Pfahler Headlight Shutter

W. Q. Pfahler, Toledo, O., is marketing what is called a headlight shutter which consists of a cover which fits over the headlights and when closed permits a small amount of light to emanate from the sides

of the headlight. Pressure on a pedal causes the headlights to be covered and releasing the pedal uncovers them. When in the former position enough light is sent from the sides of the lamps to show the position of the car and in addition a small red light in each shutter tells an oncoming driver to be careful. The Pfahler shutter in the open position is shown in Fig. 7 at 2.

#### Turning Headlight Support

The Headlight Support Co., Detroit, Mich., announced a device which enables the headlights to be turned with the steering apparatus, which may be applied by the average owner or driver and which does not require a new set of lamps. The Turning Headlight Support installed is shown in Fig. 4 applied to a Ford car, but it is adaptable to most of the existing makes of cars.





# From the Four Winds



**T**RUCK Saves Tide-Menaced Houses—A new use was found for a motor truck recently when the high tides menaced houses on the ocean front near Venice, Cal. The houses were put on rollers and a Standard truck used to haul them to safety.

**License Clerks Must Work Overtime**—Since the settlement of the muddle over motor car licenses in Ohio, State Registrar J. A. Shearer is arranging to operate his office both night and day in order to register the 90,000 cars in the state by March 1. A full force of clerks has been placed at work.

**Less Battleships; More Good Roads**—Elliott W. Major, good roads governor of Missouri, advocated the policy of building one less battleship each year and applying the amount saved to the construction of a national system of good roads, in an address delivered before the Kansas City Automobile Dealers' Association last week. He estimated that saving at ten millions of dollars each year, which would build 2,500 miles of the kind of roads Governor Major desires to construct.

**Kansas City Club Elects Officers**—New officers of the Automobile Club of Kansas City were elected last week. Watt S. Webb, president of the Missouri Savings Bank, was named president, with E. W. Shannon, first vice-president; A. D. Cottingham, second vice-president, and Bird H. McGarvey, treasurer. W. P. M. Stevens was re-elected secretary. The first work of the new officers will be to complete the new garage and club rooms under construction at 1020 Oak street and to rebuild the burned country home near Hickman Mills. The club rooms will be opened in March.

**New York Ordinances Severe**—One of the most important of the proposed ordinances recently introduced in the New York city council is that which fixes a definite minimum term of imprisonment for violators of the speed and traffic regulations. For the first offense the minimum jail term is fixed at 24 hours and the maximum term 15 days. The minimum for the second offense is fixed at 3 days and the maximum term at not more than 30 days. For the third and every subsequent conviction, the minimum prison term is fixed at not less than 5 days or more than 30 days. Violators of this ordinance can only be regarded as second and third offenders, if these offenses happen within a year after the conviction for the first offense.

**Safety Lanes Relieve Congestion**—New traffic rules establishing "lanes of safety" on Twelfth street, St. Louis, were put into effect the past week. The new rules provide for a closer observance of the "keep to the right" rule of the road. Twelfth and Locust streets, considered the busiest corner in St. Louis for motor traffic—at least 90 per cent of the city's motor vehicles passing this intersection at least three times a day—was relieved of its congestion with the first application of the new regulations. Vehicles that turn into Locust street from Twelfth or vice versa are required to hug the curb, while those passing Locust street north and south must use the center of the street between standards set by the board of police commissioners. The danger to pedestrians from vehicles that use this wide street without indicating their course is the principal reason for the new regulation. St. Louis streets are not built with "isles of safety" as are the streets in many of the large cities, a curbing acting as a standard in the

other cities, hence the placing of iron based standards in the local street. The project to make several "one way" streets in the downtown section still rests with the police board which has failed to act thus far.

**Raised Crossings Check Speeding**—A very effective check has been placed upon speeding in the city of Chilliwack, B. C., by a system of raised concrete street crossings, constructed sufficiently high above the roadway to give the passengers of a low-wheeled fast-driven car a severe shock.

**Marker Reappointed Ohio Road Boss**—Governor Cox of Ohio has re-appointed James R. Marker as highway commissioner for a term expiring June 16, 1915. There was considerable uncertainty as to the appointment although Mr. Marker was permitted to serve without being appointed. Mr. Marker has made a good record as head of the Ohio highway department and the appointment is a just recognition of his worth.

**Better Roads; Better Tire Wear**—Better roads have a greater significance to the motorist than merely to afford him more comfortable riding, to judge from returns that have been compiled for the benefit of tire companies. Figures have been prepared which show a decided increase in average mileage obtained by motorists in a section of the country which rejoices in better than the average of highways. The percentage of increased mileage is 8.7 per cent. The average mileage to the tire is about 3,700 miles.

**Columbus Carnival Opens Saturday**—Prospects for the coming motor carnival to be held under the auspices of the Columbus Automobile Club and the Columbus Auto Trades Association for the week beginning February 28 are very encouraging. It will be the second annual carnival and will take the place of the annual show. The committee in charge of the arrangements are: F. E. Avery, chairman; George Vogelsang, secretary; Frank J. Girard, A. B. Coates, Fred Boyd, J. P. Gordon and W. J. Miller. It has been arranged to have Governor Cox preside at the opening ceremonies.

**Foresters to Log Roads**—The district forester at Albuquerque, N. M., has instructed all forest officers who use motor vehicles for travel to carefully log all roads which they use. Notes will be made in regard to distances, condition of the road and surface, such as mud or sand, and other information which will be of value to travelers. The information is to be gathered primarily for official purposes, but it will be given to the public and especially to tourists. By this method, much information will be obtained which would otherwise not be available. It is hoped to have all motor roads within national forests in the state logged by the end of the coming field season.

**Gasoline Price Cut Once More**—Once more the Standard Oil Co. of Indiana, has reduced the cost of gasoline in St. Louis. During last week the price of the fluid dropped  $\frac{1}{2}$  cent a gallon, the cost being reduced from 14 to  $13\frac{1}{2}$  cents. The Pierce Corp. of Texas again followed its rival's example. The latest cut brought loud cries of protest from the independents, who are threatening a suit in the state courts under the anti-discrimination statutes of Missouri to stop the cutting of prices. They allege there is a secret connection between the Pierce and Standard corporations and the rate-cutting is a monopolistic method of eliminating the independents who have been cutting the

prices also. The last cut was the fifth within 2 months and each cut in the price of gasoline and coal oil brought an increase in the price of crude oil.

**Terre Haute Has Motor Show**—The first annual motor car opening in Terre Haute was held by local dealers last week. All of the dealers exhibited, showing about thirty different makes of motor cars. The show was advertised throughout western Indiana and eastern Illinois and a large attendance resulted.

**Place First Concrete Post**—The first concrete post, which will be one of many to mark the Cannon Ball trail between Quincy and Aurora, was set at Quincy. Twenty-five motorists were present. This was the first step in laying out the proposed highway between Chicago and Kansas City. One thousand posts have been distributed at points along the route and the work of installing them in position will be rushed. All of the cities along the route have subscribed liberally towards the expenses accrued and there has been much enthusiasm over the project.

**Urge New Road Connection**—A new connection between the Camino Real and the Borderland route which will not necessitate coming down the Rio Grande to Las Cruces and El Paso is being urged by residents of Lordsburg, N. M. The proposed route would leave the Camino Real at Elephant Butte dam, thence to Palomas, Hillsboro, Lake Valley, Mimbres Hot Springs, Santa Rita, Hurley, Silver City, then through the Burros to Lordsburg, where it will connect with the Borderland route. It is stated that the road is passable for motorists for the entire distance except a few miles between Lake Valley and Mimbres Hot Springs, which it is proposed to repair at once. The route would afford many scenic attractions.

**Race Over Ice for Trapper's Furs**—From the Canadian northwest comes a story of an 800-mile race over the smooth ice of the Athabasca river to reach an Indian trapper whose fine collection of fox skins, described by an incoming speculator, had stampeded the fur buyers at Edmonton. When the first report of a big cache of skins reached Edmonton two motor parties set out to buy the Indian's stock. There had been no snow north of Edmonton and the rivers and lakes were solidly frozen. Both drivers therefore took to the ice and attained high speed. Two days after the first party had started, the owner of a White car left Edmonton in the hope of overtaking the others. Following the same trail on the rivers and lakes, he overhauled both of his rivals and reached the trapper, 400 miles from Edmonton, a full day ahead of the others. With the entire lot of furs stowed away in the tonneau of his machine, the successful speculator turned toward the city and found both of his rivals stranded at different points on the trail. At Edmonton the furs were sold at a profit of \$2,000.

**Four-Leaf Clover Goux Talisman**—As a prognosticator of sporting events, Anna Held, the famous French actress, recently proved herself a blue ribbon winner. During a recent engagement at Indianapolis, she predicted that Jules Goux, winner of the annual 500-mile race on the speedway in 1913, would return this spring. When queried as to her authority, the petite Frenchwoman at first refused answer, but finally stated that Goux, according to old Gallic custom, had given her a four-leaf

clover to throw on the Indianapolis track. True to her compact, Miss Held did cast the talisman on the speedway one fine morning. Whether her luck will hold good or not, now that Goux has verified her predictions, only next May 30 can determine.

**Overcome by Fumes from Motor**—Abraham Schiefer, a farmer living near Bucyrus, O., was the victim of a peculiar accident when he was overcome by fumes from the engine of his motor car while he was repairing it. For a while his life was in danger, but he recovered after being worked with for several hours.

**Sun Will Not Set on Cyclecar**—That the sun never sets upon the reign of the American built cyclecar is now an assured fact for with the sale of ten Imp cyclecars to Nome, Alaska, by the Milwaukee agents and the appointment of the American Hardware and Plumbing Co. at Manilla, Philippine Islands, John Bliss, San Jose, Costa Rica; Volcano stables, Honolulu, Hawaii Islands, Santiago A Panzardi San Juan, Porto Rico and the Delftsche Motoren Handel of Kolk 3, Delft, Holland and prominent agents in England and Russia, the entire civilized world will soon be supplied with American-built cyclecars running day and night from 66° north in the Arctic circle at Nome to 14° south in the island of Luzon.

**Rockford Motorists to Build Club House**—Members of the motor club of Rockford have subscribed \$1,000 towards the sum of \$5,000 needed to purchase the site for the proposed new club house south of Rockford on the river road. Shares of stock have been fixed at \$25 and will be sold to any person owning a motor car or motor boat. An option has been secured on the site favored. The tract comprises 7 acres and is in the center of a picturesque section of Winnebago county. It is believed that with the erection of a club house at this point, the resort will be popular among Chicago and other tourists. It is believed that the structure can be financed without difficulty and the foundation laid this spring.

**Mexico Orders 500 War Cars**—The war department of the Mexican government has announced that it will buy 500 motor car chassis from Italian makers, which will be armored and fitted for operations against the revolutionaries, and particularly to patrol and protect the railway lines of Mexico which have suffered heavy losses at the hands of the rebels. It is planned to armor the cars and build the other equipment at Aguascalientes, where experiments have been made and several machines turned out which have proved entirely satisfactory. Each car will carry one or two machine guns. They will be equipped with solid tires, on account of the weight from the armor plates protecting the car and in order to save time and prevent dangerous situations arising in case of punctures.

**Milwaukee Gets Road Congress**—The first annual Northwestern Road Congress, now being organized among the states of Wisconsin, Minnesota, Illinois, Iowa, Michigan, North Dakota, South Dakota and possibly Nebraska, will be held in Milwaukee, Wis., in November under the auspices of the Milwaukee Citizens' Business League, one of the most potent factors in highway improvement among all American business leagues. The convention will be held in the Auditorium, and an elaborate exposition of all kinds of machinery appertaining to road work will be held in conjunction with the congress. The association, which is being organized through the initiative of the Milwaukee league, will take in good roads experts, engineers, state, county and municipal highway commissioners, town and county officials and city boards of public works. This will give a membership of approximately 3,000. At each congress an additional

assembly of 1,000 is expected, this number to be derived from material producers, such as gravel, cement, sand, steel and machinery builders. Definite dates will be selected as the permanent organization is completed.

**St. Paul Club After More Members**—The St. Paul Automobile Club has twenty-six teams of members out in a canvass to raise the membership to at least 1,250, or half the car owners in the city. The club now has 500 members and plans to pass the Minneapolis mark of 1,100. The initiation fee has been waived.

**Build Motor Bob Sled**—S. H. Kinsey and Harry Bauders of Fremont, O., built a motor-driven bob-sled recently which attracted considerable attention in that section of the state. The vehicle consisted of the usual bob sled equipped with motorcycle wheels and engine and a speed of 30 miles per hour was attained. A number of long trips were taken in the sled during the recent heavy snow.

**Motorists Gather at Lancaster**—One of the largest gatherings of motorists ever held in Lancaster, Pa., was represented at the annual dinner of the Lancaster Automobile club held at the Hotel Wheatland last week. Covers were laid for three hundred. Officials of motor clubs of several other cities, representatives of the state highway department, city and county road officials and good road advocates were present and made addresses.

**Check on Accidents Asked**—Members of the Columbus Automobile Club of Columbus, O., as well as city officials have started a movement for the passage of an ordinance compelling pedestrians to cross streets only at street intersections. Drivers of motor cars have much trouble avoiding pedestrians who persist in crossing in the middle of city blocks. The Columbus police department is in hearty sympathy with the proposed ordinance.

**Seek Drivers for Tacoma Races**—Frank Allyn, Jr., president of the Tacoma Carnival Association, and Dr. C. P. Gammon, of Tacoma, have gone to Santa Monica to make contracts with the drivers to participate in the Tacoma road races July 4 and 5. Secretary Dunn reports that thus far \$15,000 in cash has been subscribed to the Tacoma speedway, and that the new track will be ready for use at least a month before the date set for the races.

**Texas Road Improvements Planned**—Plans for a spring campaign to improve the roads of the panhandle section of Texas so that they will be in good condition by the time the touring season opens are being made by President Holman of the Colorado-to-the-Gulf Highway Association, who is sending out to each county chairman in his division suggestions for good roads campaigns. The work of placing the road signs along the highway between Denver, Colo., and Galveston will soon be started. The signs are to be placed every 5 miles.

**May Lose State Highway System**—Because of the defeat of the proposed amendment to the state constitution authorizing a bond issue for road building, Pennsylvania may have to abandon its state highway system and turn 10,000 miles of state highways back upon the 1,200 townships from which they were taken. Under the Sproul act of 1911 the state of Pennsylvania took possession of 8,600 miles of roads that form connecting links between county seats and other important communities. In 1913, 1,400 miles were added. When the Legislature created this system of main state highways it was expected that funds for improving and maintaining the roads would be provided by a bond issue. At the election of November, 1913, however, an amendment to the constitution providing for an issue of \$50,000,000 bonds was voted down, and under the terms of the constitution another such amendment

cannot be voted on for at least 5 years. A serious problem therefore arises: either the Sproul act must be repealed or means must be devised for getting enough money out of state revenues for at least maintaining the roads in their present condition.

**Endorse Permanent Road Building**—State appropriations and the building of permanent roads were endorsed by the Iowa Association of Engineers and Highway Officers at its annual meeting last week in Council Bluffs. Officers were elected as follows: President, W. G. Raymond of Iowa City; vice-president, William H. Kimball of Davenport; secretary-treasurer, S. M. Woodward of Iowa City; directors, M. G. Hall of Centerville and J. B. Davidson of Ames.

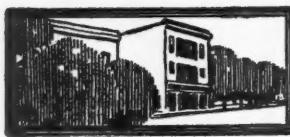
**Prophecy 90,000 Iowa Registrations**—Iowa state officials expect the number of motor cars in the state to reach 90,000 this year. They have ordered number plates for that many and registrations to date indicate that the estimate is conservative. A total of 46,000 number plates have been issued since January 1 and 24,000 old cars are not yet registered. Last year the average tax paid for each car was \$10.63. This year it is expected to be between \$9 and \$10 because of the large number of less expensive cars being purchased.

**Toledo Club Plans for Busy Year**—The following officers were elected at the annual meeting of the Toledo Automobile Club; Royal R. Scott, president; H. W. Blevins, vice-president; C. G. Thompson, secretary; and Harry M. Bash, treasurer. The present membership of the club is 400 and plans are now being formulated to bring the membership of the organization to 1,000. Secretary Thompson has just received a consignment of road markers which will be posted on all roads within 25 miles of Toledo. The club is also working with the A. A. A. for road improvement.

**Bear Holds Up Motorist**—To be held up by a bear while riding in a motor car was the recent experience of John Oleson, residing at Benton, Pa. Oleson was returning to his home in his car when he was halted by a big black bear, which loomed up suddenly in the road ahead of him. The lights blinded the bear and it stood on its hind legs and winked and blinked at the motorist. When Oleson opened his muffler and raced his machine, the animal took fright and ran with such force against a barbed-wire fence that it rebounded into the road. It quickly recovered and scampered off into the woods.

**Impressed by Cyclecar Movement**—H. G. Sharpe of Carlton House, England, who has been in this country for the past month attending the New York and Chicago shows and visiting American motor car factories, left New York last week for England. Mr. Sharpe, who was accompanied by his wife, was much impressed with the quick birth, growth and scope of the cyclecar industry in America and took back with him to England, a ten-year contract for the British Isles for the Imp cyclecar. The contract calls for delivery of a thousand cars a year during the life of the contract.

**Motorists to Follow Washington's Route**—Plans were perfected at Philadelphia last week by a committee of the Sons of the American Revolution for a motor pilgrimage from Philadelphia to Cambridge, Mass., next June. The run will be unique, in that the tourists will rigidly adhere to the route taken by Washington in June, 1775, when he left this city to go to Cambridge to assume his commission as commander-in-chief of the American armies. As near as is possible the tourists will repeat every movement of Washington, stopping at the places he did and consuming the same space of time, 10 days. The state societies of Pennsylvania, New Jersey, New York, Connecticut and Massachusetts will be represented.



# Among the Makers and Dealers



**KELLY-SPRINGFIELD** Declares Dividend  
—The Kelly-Springfield Tire Co. has declared a quarterly dividend of 1.5 per cent on the preferred capital stock, payable April 2.

**M. C. Rumely Leaves LaPorte Firm**—M. C. Rumely, who entered the service of the M. Rumely Co., at LaPorte, Ind., 30 years ago, and who during this time has been connected with nearly every department of the industry, has resigned. After a rest he will enter business for himself.

**Discontinue Sales Relation**—The J. S. Bretz Co. has terminated its selling relations with the Hartford Auto Parts Co., the latter company marketing its own product in the future. Meanwhile the J. S. Bretz Co. will confine its operations to the importation and selling of F. & S. ball bearings, German chrome steel balls, and the Bowden wire mechanism made in England.

**Clutch Company Enlarges Plant**—The Brown Clutch Co. of Sandusky, O., has been compelled to largely increase its manufacturing facilities. A new building, built throughout of concrete and equipped with the latest machinery, has been added to the plant. This structure, which is 150 feet long and 60 feet wide, will be used as a foundry for the present, but later it is expected that another building will be erected for this purpose, and the building just completed will be the home of the machine department.

**Owner May Get Nyberg Plant**—Henry F. Nyberg, who was the principal owner of the Nyberg Automobile Co. at Anderson, Ind., offered the only bid for the plant and business in its entirety. There were a number of bids on parcels of the factory and equipment. Mr. Nyberg's bid was \$7,000 cash and assume liens amounting to \$22,000. Fred Van Nuys, trustee in bankruptcy, will recommend that the federal court accept the bid of Mr. Nyberg as the best offer submitted. Mr. Nyberg expects to resume operations in the plant within 30 days if the property passes under his control.

**Firms Consolidate to Increase Output**—Papers have been filed in Trenton, N. J., covering the incorporation of the Motokart Co., which will take over the Tarrytown Motor Car Co., Inc., and the Steinbook Engineering Co., Inc. The first named concern for the past 6 months has been exploiting the Motokart parcel delivery wagon for which the last mentioned concern has furnished engines and other mechanical units. The Tarrytown Motor Car Co., Inc., has had some difficulty in financing the large business received and it is to accommodate new interests that the consolidation is being made. The new company will be capitalized at \$500,000 and will at once push production upon an increased scale.

**New Motor Company Organized**—Several Indianapolis capitalists and manufacturers have organized the Automatic Gas Motor Co., which has been incorporated with \$200,000 capital. The company has a recently perfected motor, the details of which it is not ready to disclose. This motor will either be manufactured in Indianapolis or shop rights to manufacture it will be given on a royalty basis. The details are to be worked out within the next 2 weeks. The motor is designed for motor cars, cyclecars and motor boats. The directors and principal stockholders of the company are H. H. Fulton, a promoter; E. E. Stafford and C. W. Hackleman, president and manager respectively of the Stafford Engraving Co.; Henry

F. Campbell of the Stutz Motor Car Co.; Hervey Bates, Jr., president of the American Hominy Co., and Fred B. Whitlock, secretary and treasurer of the Indianapolis Foundry Co.

**Takes Charge of Franklin Sales**—Arthur Holmes, vice-president of the Franklin Automobile Co., has assumed charge of the Franklin sales department, succeeding J. G. Barker, resigned.

**New Offices for M. and A. M.**—The Motor and Accessory Manufacturers have leased offices in the Aeolian building, 29 West Forty-second street, New York, for headquarters. It expects to take possession of the new offices on or about April 1.

**Tire Company Doubles Capital Stock**—Papers have been filed with the secretary of state increasing the capital stock of the Pharis Tire and Rubber Co. of Columbus, from \$50,000 to \$100,000. The company operates a tire factory in Newark, O., which will be increased to a large extent.

**New Factory for Cleveland Concern**—The Paris & Bingham Co., manufacturer of cold-pressed steel stampings, has awarded contracts for the erection of a new building at Madison avenue and West One Hundred and Sixth street, Cleveland, O. The structure will be 90 by 100 feet and will be one-story high. The building will cost \$180,000. Eight and one-half acres of land have been purchased. In its present quarters on Hamilton avenue the company is exceedingly cramped for room. Over 1,500 frames a day are being

shipped to the Ford plant in Detroit. This has necessitated three shifts of employees. The west side branch will be completed and occupied by June 1.

**Haines Leaves Anderson Electric**—Ward P. Haines has resigned his position as advertising manager of the Anderson Electric Car Co., Detroit.

**In Market for More Equipment**—The Crescent Motor Co., of Carthage, O., which recently secured the plant of the defunct Ohio Motor Car Co., will be in the market for additional equipment soon. Plans are in preparation for additions to the manufacturing facilities.

**New Kerosene Engine Patented**—Patent rights have been secured by T. A. Taylor of the Kenton Gas Engine Co., Kenton, O., on an invention for the use of kerosene in place of gasoline for an internal combustion engine. The device will be manufactured by the Kenton Gas Engine Co. and consists of a fuel heater to be attached to gas engines.

**Louisville Firm Orders 176 Buicks**—What is said to be the largest single shipment of motor cars consigned to one dealer that has even been made east of the Mississippi River will be received shortly by the Leyman-Buick Co., distributor of Buick cars in Kentucky. The value of the consignment of machines, which total 176, is placed at \$211,720, while the freight charges alone will be more than \$3,000. The trainload of 61 freight cars will be shipped to Cincinnati

## Recent Incorporations

**Albany, N. Y.**—L. & G. Motor Co., capital stock, \$1,000; motor car business; incorporators, C. H. Gardiner, W. C. Longleway, A. O. Van Suetendael.

**Augusta, Me.**—Ceco Cycle-Car Sales Co., capital stock, \$50,000; to deal in motors; incorporator, E. M. Leavitt.

**Augusta, Me.**—Continental Engineering Co., capital stock, \$1,000,000; to deal in motors; incorporator, E. M. Leavitt.

**Albany, N. Y.**—Partridge, Clark and Kerrigan; capital stock, \$100,000; to manufacture motor cars; incorporators, E. S. Partridge, B. A. Wordemann, S. J. Wagstaff.

**Boston, Mass.**—Duval Spring Tire Co., capital stock, \$100,000; to manufacture spring tires; incorporators, E. S. Plaisted, A. L. Duval, R. B. Whitman.

**Boston, Mass.**—Columbia Rubber Co., capital stock, \$50,000; incorporators, P. H. Crowley, W. F. Crowley, H. G. Cameron.

**Boston, Mass.**—Autophone Co., capital stock, \$600,000; directors, E. A. Lyman, C. W. Woodward, C. E. Woodward.

**Boston, Mass.**—Duval Spring Tire Co., capital stock, \$100,000; directors, E. S. Plaisted, L. Duval, R. B. Whitman.

**Bridgeport, Conn.**—American Cyclear Co., capital stock, \$300,000; incorporators, I. B. Trumbull, A. H. Trumbull, R. F. S. Trumbull.

**Brockton, Mass.**—Sterling Motor Co., capital stock, \$50,000; incorporators, W. T. Marsh, G. M. Greene, R. M. Mackin.

**Brooklyn, N. Y.**—Acorn Insulated Wire Co., capital stock, \$100,000; to manufacture insulated wire; incorporators, W. V. Donovan, J. Quittner, J. T. McMahon.

**Brooklyn, N. Y.**—Werchen Garage, capital stock, \$2,500; motor car business; incorporators, D. Werchen, D. S. Werchen, P. Miller.

**Buffalo, N. Y.**—Gray-Line Taxi Co., capital stock, \$10,000; incorporators, W. I. Waters, W. H. Riehl, S. S. Jewett.

**Boston, Mass.**—Hercules Tire Protector Co., capital stock, \$10,000; incorporators, J. A. Gilbert, E. Bald, A. E. Elster.

**Brockton, Mass.**—Sterling Motor Co., capital stock, \$50,000; incorporators, W. R. March, G. M. Green, R. M. Mackin.

**Camden, N. J.**—Brown & Robb Co., capital stock, \$100,000; to manufacture motor cars; incorporators, E. L. Brown, T. H. Robb, H. John-

**Cincinnati, O.**—Remeline Co., capital stock, \$40,000; to deal in motor cars; incorporators, M. E. Remeline, R. C. Nepper, C. Sawyer, J. L. Remeline, F. C. Williams.

**Collingwood, O.**—Collingwood Garage Co., capital stock, \$10,000; taxicab business; incorporators, C. Lemster, O. L. Hankinson, K. S. Lemster, B. Decker, C. L. Deeds.

**Canton, O.**—Auto Products Co., capital stock, \$150,000; to manufacture and deal in motor car specialties; incorporators, D. Thomas, J. F. Mou, S. Ake, M. J. Martin, J. W. Cline.

**Columbus, O.**—Spring Street Garage Co., capital stock, \$5,000; incorporators, J. M. Hamilton, E. M. Hamilton, L. R. Woerner, F. H. Hamilton, G. G. Hamilton.

**Columbus, O.**—Spring Street Garage, capital stock, \$5,000; general garage business; incorporators, J. M. Hamilton, E. K. Hamilton, L. H. Woerner, F. B. Hamilton, G. O. Hamilton.

**El Paso, Tex.**—International Auto Co., capital stock, \$30,000; incorporators, J. W. Stockard, R. W. Newton, J. F. Primm.

**Pt. Wayne, Ind.**—Alpha Co., capital stock, \$100,000; to manufacture pumps; incorporators, F. Bowser, G. C. O'Connell.

**Hamilton, Ont.**—Fox Chain Co., capital stock, \$20,000; to manufacture and deal in tire chains.

**Hazleton, Pa.**—Hazleton Motor Service, capital stock, \$5,000.

**Houston, Tex.**—Levand Auto Supply Co., capital stock, \$20,000; incorporators, H. Levand, J. M. Levand, J. L. Pujol.

**Kane, Pa.**—Kane Motor Car Co., capital stock, \$50,000.

**La Porte, Ind.**—Indiana Auto Supply Co., capital stock, \$10,000; repair business; incorporators, A. Gall, W. Peitz, A. Lindgren.

**Mansfield, O.**—League of American Automobilists, capital stock, \$1,000; to deal in motor car supplies; incorporators, J. E. LaDow, J. Reinhardt, M. Kirkpatrick, F. M. Remy, C. Ritter.

**Mt. Hope, W. Va.**—Mt. Hope Garage Co., capital stock, \$10,000; to conduct agency; incorporators, J. F. Garnet, W. H. Darnell, T. C. Fazeley, A. W. Rodhardtzel.

**Newark, N. J.**—Charles E. Ball Co., capital stock, \$130,000; incorporators, F. R. Ramsey, W. L. Payne, W. Bell.

**Philadelphia, Pa.**—Interboro Motor Truck Co., capital stock, \$10,000.

**San Antonio, Tex.**—San Antonio Auto Supply Co., capital stock, \$6,000; incorporators, P. K. Magruder, T. E. Moore, W. E. Newton.

**Springfield, O.**—Motor Mart Co., capital stock, \$25,000; to deal in and repair motor cars; incorporators, G. W. Swope, C. W. Fritz, Sr., J. H. Lawwell, J. A. Ross, Roy Weikart.

**Tulsa, Okla.**—Tulsa Gasoline Mfg. Co., capital stock, \$7,500; incorporators, T. C. Hughes, A. F. Newkew, W. E. Rohde.

**Winnipeg, Man.**—Great West Motor Co., capital stock, \$50,000.

**Winnipeg, Man.**—Lion's Auto Garage, capital stock, \$100,000.

where the train will be broken up and several carloads left for distribution by the Cincinnati office; the rest will go to dealers in Kentucky, southern Indiana and southern Ohio. The Leyman concern maintains an office in Louisville and Cincinnati.

**Three Firms Join M. and A. M.**—The following concerns have been elected to membership in the Motor and Accessory Manufacturers: Michigan Steel Casting Co., Detroit, Mich.; the New Haven Clock Co., New Haven, Conn., and the Standard Tool Co., Cleveland, Ohio.

**Kosmath Buys Miller Car Material**—The Kosmath Co., Detroit, has purchased from the receiver of the Miller Car Co. the designs and material which the latter had on hand at the time of the failure for the 1,000 delivery wagons which it was building. The manufacture of these wagons will be continued by the Kosmath Co.

**Vulcanizer Plant is Sold**—The Tire Repair Equipment Co., Appleton, Wis., has purchased the stock, machinery, patents and business of the Meili-Blumberg Co., New Holstein, Wis., manufacturing attached sliding clamp vulcanizers. The Appleton company will continue the manufacture of this device under the trade name of Badger steam vulcanizer. The Appleton plant will be enlarged at once.

**Halt Called on Menominee Sales**—The D. F. Poyer Co., Menominee, Mich., manufacturing Menominee motor trucks, has been obliged to call a halt on all further sales for 1914 delivery, due to the fact that its stated output of 500 cars is entirely sold out. L. F. Fortin, sales manager, has just returned from a trip lasting 8 weeks through the west and turned in orders for 240 cars. Orders from now on will be taken subject to delivery after 12 months.

**Invents New Puncture-proof Tire**—Martin Rasmussen, an inventor and designer of Racine, Wis., has been granted patents on a new type of puncture-proof pneumatic tire for motor cars which it is proposed to manufacture in Racine. The invention embodies a casing and tube, both of fabric and rubber, which are claimed to be practically indestructible when used in connection with a certain liquid preparation. The total cost of the tire and tube and sufficient liquid is less than that of the present pneumatic tire casing. In fact it is claimed that the Rasmussen tire can be sold at half of the cost of the ordinary pneumatic tire of today.

**Lozier Plants Working to Capacity**—With the shipment of the first Lozier four on February 11, the two Lozier factories at Detroit and Plattsburg received their formal introduction to a quantity production schedule. Sales Manager Paul Smith states that with about 5,000 orders on hand for early delivery, Lozier forces will be working full tilt for some time to come. Production Manager Pollard, in charge of the plants at Detroit and Plattsburg, is arranging his plans to allow for a production of up to forty cars per day. Coupled with this output the plants will probably be operated on double shifts if this is found necessary to meet deliveries.

**Crank Company Incorporated**—The Clark Crank Co. of Muncie, Ind., organized several months ago to manufacture a patent safety engine starter, was incorporated at Indianapolis last week with a capital stock of \$75,000.00. The following directors were elected: Judge W. W. Spencer, Indianapolis; William R. Clark, Muncie; C. Roy Hathaway, Muncie; Glen R. Funk, Toledo, and T. H. Miller, Toledo. A factory location has not as yet been definitely decided upon. Five different locations are under consideration: Muncie, Ind.; Indianapolis, Ind.; Jacksonville, Fla.; Richmond, Va., and Toledo, O. The principal article of manu-

facture will be a safety crank for motor car, motor boat or explosive engine, so designed as to eliminate all danger from cranking. The company will also make an engine starter to be used in connection with this crank. Both patents are the invention of William R. Clark of Muncie, Ind.

**Standard Buys Hackney Company**—The Hackney Mfg. Co. of St. Paul has sold its business to the Standard Motor Co. of Mason City, Ia. The new company will make the Hackney motor plow tractors and motor trucks. The Hackney brothers will remain interested in the business. The new company will market some of its stock and plans to enlarge the St. Paul plant.

**To Protect Dean Stockholders**—A. L. Garford, chairman of the creditors committee of the Dean Electrical Co. of Elyria, O., has formulated plans to protect the stockholders of the company from loss occasioned by recent financial troubles. The plan embodies the issuing of \$200,000 additional stock and a meeting of the stockholders has been called to consider the proposition.

**Will Not Move from Dayton**—The management of the Apple Electric Co. of Dayton, O., has decided not to move the factory from that city, but on the contrary will take steps to enlarge the capacity of the plant. The company has been consolidated with the Splitdorf Electrical Co. of Newark, N. J. The old corps of officers will have charge of the Dayton plant under the new regime.

**Spring Company Purchases New Factory**—A deal has been closed whereby the Springfield Spring Co. of Springfield, O., has purchased the site and plant of the Owen Machine Tool Co. on East Pleasant street. The spring company has been looking for a location since the destruction of its plant by fire last December. The capital stock of the company will be increased from \$25,000 to \$60,000 to furnish sufficient capital for the new location and additional machinery.

**Joins Norma Co. of America**—O. P. Wilson, of the purchasing department of the Westinghouse Electric and Manufacturing Co., has resigned to accept the position of assistant general manager of the Norma Co. of America, 20-24 Vesey street, New York, manufacturer and importer of ball bearings, roller bearings, precision instruments, etc. Mr. Wilson has been connected with the Westinghouse company for 14 years and for the last 10 years has been one of its head buyers.

**No More Landau-Roadsters**—Studebaker dealers have been informed that the factory has entirely finished its run of four-cylinder landau-roadsters and can accept no more orders, due to centralization on touring car production. This model was of the convertible type. The fact that it has been entirely sold out is due largely to the appeal which it made to physicians all over the country. Similar announcement is expected soon regarding the landau-roadster body, mounted on the Studebaker six chassis, of which only a limited supply remains.

**Forming Accessory Company at Green Bay**—Under the direction of the Commercial Club of Green Bay, Wis., a corporation is being organized to establish a factory for the production of motor car parts, such as hub-caps, door knobs and plates, lamps, handles, etc., as well as surgical implements, fittings and other similar articles, out of a new metal alloy formulated by J. A. Fletcher of Chicago, well known in the copper and brass foundry field. Mr. Fletcher several years ago perfected a metal which appears to be as strong as steel but needs no plating or polishing. It is a solid silver white metal and will not tarnish or rust. John F. Martin, president of the commercial club, is

making a canvass of Green Bay capitalists and intends to form a \$100,000 corporation to establish a plant employing from 150 to 250 workmen.

**Purchase Hagstrom Mfg. Co.**—The Hagstrom Mfg. Co. of Salina, Kas., manufacturer of electrical specialties and specializing in the making of blowout patches, has been sold to J. F. Merrill, president of the Farmers National Bank of Salina; Charles Landers, the production manager; and R. J. Laubengayer, sales manager.

**Buys Hart-Kraft Machinery**—The machinery and unfinished stock of the Hart-Kraft Motor Co. has been purchased by the Flinchbaugh Mfg. Co., of York, Pa., which will engage in the repair of the cars built by the Hart-Kraft Company. The Flinchbaugh Company manufactures portable and stationary gasoline engines.

**New Universal Truck Manager**—F. K. Parke, formerly vice president and general manager, and G. L. Brush, formerly assistant secretary, have left the Universal Motor Truck Co. George Uihlein of Milwaukee has established headquarters at Detroit and has personally taken charge of the management of the company.

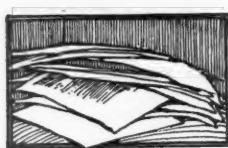
**To Make New Piston Rings**—George McCadden of St. Cloud, Minn., is organizing a company to manufacture the piston ring he has invented to prevent leakage of gas. The company will have \$50,000 capital and will lease a building in Minneapolis. Mr. McCadden is proprietor of the McCadden Machine Works.

**Order 2,000 Saxon Cars**—W. J. Parrish and C. A. Forrester of Cleveland, Ohio, who recently took over the Packard agency in this city, have closed arrangements whereby they will become the southwest agents for the Saxon, having contracted for 2,000 of these cars. Parrish and Forrester also have taken the local agency for the Baker electric. They will continue to operate their Packard agency in Cleveland.

**Lozier Holds Service Convention**—More than fifty service men from the establishments of Lozier dealers throughout the country were the guests of the Lozier Motor Co. at the first annual service convention held in Detroit last week. The service men inspected the factory, tore down and rebuilt the 1914 models and listened to talks by the factory representatives of accessory concerns supplying the Lozier accessories.

**Ohio Electric Pays Dividend**—The Ohio Electric Car Co., Toledo, is now in the cash dividend class. Heretofore a stock dividend covering its earnings of the previous year was the rule but this year the company declared a 6 per cent dividend, payable quarterly, and making with the stock dividend a return of 10 per cent on the investment. At the first meeting of the new board of directors last week these officers were elected: President, F. H. Dodge; vice-president, C. M. Foster; treasurer, Otto Marx; general manager, H. P. Dodge. H. E. Marvin, M. V. Barbour and A. E. Baker have been added to this board of directors. The officers reported a marked increase in sales.

**Interstate Makers Organize**—The Interstate Motor Car Co., recently formed to revive the manufacture of the Interstate car at Muncie, Ind., perfected an organization at a meeting of the stockholders held last week when the following board of directors was elected: George A. Ball, Edwin B. Ball, Frank C. Ball, C. Ball, J. M. Waring, Theodore F. Rose, F. D. Rose and B. W. Twyman. B. W. Twyman has been installed as general manager of the production and sales. He was formerly sales manager for the E. M. F. company and the Studebaker Corp., Detroit, and until recently president of the Twyman Motor Car Co., motor car jobber with offices at Columbus, Cincinnati and Dayton, Ohio.



# Brief Business Announcements



**COLUMBUS, O.**—The Columbus Garage and Machine Co. is the name of a new repair concern located at 560 East Mound street.

**Indianapolis, Ind.**—The Republic tire agency has moved from 35 West Michigan street to 425 North Capitol avenue, Indianapolis. An agency for the Akron-Miller line of tires and accessories has been opened at 429 North Meridian street. Those interested in the agency are L. E. Broering, W. G. Ruske and Howard Smith.

**New York**—Capt. J. B. Dudley has taken the Lincoln car for the New York territory and also Philadelphia. Temporary quarters have been established in the latter city in the North American building, the concern going under the name of the Lincoln Motor Car Co. The New York headquarters are in the United States Rubber building.

**Marshfield, Wis.**—Orrin Clark and Harlow Sherman of Marshfield, Wis., have established a tire repair and supply shop at 506 South Central avenue, to be conducted under the style of Marshfield Vulcanizing Co. A complete equipment of steam, gas and electric vulcanizing apparatus has been purchased. Messrs. Clark and Harlow were associated with the Jensen Garage at Grand Rapids, Wis., until recently.

**New York**—The Benz factory at Mannheim, Germany, has completed new arrangements for the handling of its cars in the United States. The Benz Automobile Sales Co., a new corporation, takes over the agency for the Benz cars and also for Gaggenau trucks, which are built by the same concern. Those in the new company

are Russell Engs and P. V. Clodio. Mr. Clodio was formerly sales manager for the Benz Auto Import Co.

**Columbus, O.**—The John Immel & Sons Co., 16 East Livingston avenue, has taken the agency for Timken roller bearings for central Ohio.

**Spokane, Wash.**—L. A. and John A. Nichols, Jr., of Spokane, last week purchased a half interest in the Franklin Motor Car Co., which from now on will be known as the Franklin-Nichols Co. The company will be located at 1214 Second avenue.

**Burlington, Wis.**—Edward Zwiebel & Sons, Burlington, Wis., who have conducted a garage in connection with their plumbing and heating establishment, has organized the Edward Zwiebel Bros. Co., with a capital stock of \$15,000, and will increase the motor car business. The members of the new corporation are Edward, Raymond, George and Leo L. Zwiebel.

**Kaukauna, Wis.**—The Kaukauna Farm Implement Co., Kaukauna, Wis., has opened a motor car selling and repair department in connection with its implement and vehicle business and will act as distributor of the Ford for a large territory in the Fox river valley. For the present the business will be conducted in the implement warehouse.

**Minneapolis, Minn.**—J. W. Hunziker has taken charge of the Luverne Automobile Sales Co., 1210 Hennepin avenue. This company handles four models of pleasure cars with bodies for five and seven passengers on four and six-cylinder chassis, and the Twin City commercial cars in three light

delivery models on Luverne chassis. The company has an office also at 107 West Seventh street, St. Paul.

**Lagrange, Ind.**—William McCafferty has opened a garage and repair shop at Lagrange, Ind. He was formerly connected with the Bass foundry and machine shop at Fort Wayne.

**Kansas City, Mo.**—The National Motor Car Co., a Missouri corporation handling the National line in the southwest territory, has taken new quarters at 1733 Grand avenue. H. F. Sundin is president of the recently incorporated company and H. E. Hunt secretary and treasurer. Mr. Hunt formerly was connected with the Mercer factory branch here.

**Kansas City, Mo.**—The local factory branch of the Studebaker Corp., of which Nelson S. Riley is the manager, entertained 125 out of town dealers at a "factory talk" dinner here last week. Walter Brady, factory representative, Mr. Riley, Walter Robbins of the Wagner Electric Co. of St. Louis and Fritz Oberhau of the local Goodrich agency, made short talks.

**St. Louis, Mo.**—The merger of the Detroit Electric Car Co. with the Electric Garage and Service Co. creates the largest service station in the city. The company will maintain an electric vehicle garage on Delmar avenue which will have storage facilities for one hundred cars and have a large paint, machine shop and battery department in addition. The new company will distribute the Detroit electric and has abandoned the agency of the Buffalo electric pleasure car which the electric company formerly handled. The company, however, will continue to sell

## Recent Agencies Appointed by Motor Car Manufacturers

### PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
Athens, O.	Lstro's Garage	Overland	Del Rio, Tex.	Fred Dietert & John Dobkins	Maxwell
Abilene, Kas.	E. E. Coulson	Packard	Delta, Colo.	Willis A. Davis	Maxwell
Abilene, Kas.	E. E. Coulson	Baker	El Reno, Okla.	W. J. Burns	Cartercar
Arlington, Ia.	Aplington Auto Co.	Maxwell	Everest, Kas.	Jensen Bros.	Cartercar
Auburn, Cal.	Otto E. Thomas	Maxwell	Evansville, Ind.	Sanders Motor Co.	Metz
Adair, Ia.	T. M. Elliott	Maxwell	Ewing, Mo.	E. S. Terpening and C. W. Terpening	Maxwell
Albertville, Ala.	Hanes Motor Co.	Maxwell	Erie, Pa.	East Side Garage	Maxwell
Alliston, Ont.	George B. Walker	Maxwell	Fort Dodge, Ia.	J. W. Crouse	Franklin
Akron, O.	Louis Zimarik	Hupmobile	Front Royal, Va.	R. F. Ermert	Maxwell
Alpena, Mich.	C. F. Steele	Maxwell	Florala, Ala.	J. H. Burgess, Jr.	Maxwell
American Falls, Idaho	Jones & Davis	Maxwell	Gallatin, Mo.	G. P. Netherton	Cartercar
Auburn, Ind.	Campbell & Son	Maxwell	Garden City, Mo.	J. W. & G. W. Nelson	Cartercar
Ardmore, Mo.	Frank M. Mabrey	Metz	Glasgow, Mo.	Glasgow Garage	Cartercar
Battle Creek, Mich.	W. E. Teeters	Oakland	Greenleaf, Kas.	William Kennington	Cartercar
Battle Creek, Ia.	R. W. King	Maxwell	Galva, Ill.	A. L. Swanson	Maxwell
Bedford, O.	G. A. Deisman	Maxwell	Gallup, N. M.	C. L. Day	Hupmobile
Bloomfield, Neb.	J. B. Gossard & Co.	Oakland	Hartford, Conn.	Imperial Motor Car Co.	Grant
Beloit, Kas.	Beloit Auto Company	Baker	Holden, Mo.	Holden Garage	Cartercar
Beloit, Kas.	Beloit Auto Company	Packard	Hartford, Conn.	Palace Auto Service Co.	Mitchell
Brooklyn, N. Y.	I. N. Allen & Co.	Ohio	Hamilton, O.	Central Motor Co.	Maxwell
Brownstown, Ind.	Hackendorf-Roberts & Richards	Maxwell	Huntington, Ind.	Central Garage	Maxwell
Barnes City, Ia.	Garing Brothers	Maxwell	Indiana, Pa.	Clymer Motor Co.	Franklin
Conneaut, O.	A. F. Joslin	Maxwell	Ithaca, N. Y.	E. J. Trapp	Maxwell
Brownstown, Ind.	Brownstown Motor Car Co.	Maxwell	Joplin, Mo.	Rightway Auto Company	Cartercar
Bangor, Pa.	Brays Garage	Hupmobile	Joplin, Mo.	Kleinschmidt & Hempill	Baker
Berwick, Pa.	R. E. Paden	Hupmobile	Joplin, Mo.	Kleinschmidt & Hempill	Packard
Brighton, Ill.	H. F. Martin	Maxwell	Junction City, Kas.	Wenger & Brockman	Baker
Blairstown, N. J.	Louis Stout	Maxwell	Joplin, Mont.	M. B. Meagher	Maxwell
Corning, Ia.	Macks Brothers	Oakland	Jasper, Ala.	Jasper Auto Co.	Maxwell
Chillicothe, O.	Theodore Johnson	Paige	Jeromeville, O.	J. C. Clippinger & Co.	Hupmobile
Columbus, O.	Pausch-Selbach Wagon & Auto Co.	Auburn	King City, Mo.	E. L. Culver	Cartercar
Centralia, Mo.	Lyons Auto Co.	Cartercar	Long Branch, N. J.	A. Lustbaum	Maxwell
Chickasha, Okla.	Boone & Rickerts	Cartercar	Logan, Utah.	Utah-Idaho Auto Co.	Maxwell
Columbus, Ga.	L. M. Thweatt	Oakland	LaCrosse, Wis.	Berg Piano Co.	Hupmobile
Cole Camp, Mo.	Rudolph Meyer	Cartercar	Lawrence, Kas.	Lawrence Street Motor Co.	Baker
Chanute, Kas.	Chanute Auto Company	Baker	Linneus, Mo.	Riddle & Mace	Oakland
Concordia, Kas.	Chanute Auto Company	Baker	Luverne, Ala.	A. L. Watts	Cadillac
Concordia, Kas.	Concordia Garage	Packard	Lancaster, O.	Leroy Huddle	Chalmers
Chester, Ill.	Herschbeck Brothers	Packard	London, O.	J. M. Boecker	Paige
Clarksville, Mich.	H. N. Getty & C. Roth	Maxwell	Mt. Pleasant, Mich.	T. H. Battle	Oakland
Coleman, Tex.	G. P. Roquemore	Maxwell	Minneapolis, Minn.	Palmer Cyclecar Co.	Princess
Clearfield, Utah	Clearfield Mercantile Co.	Maxwell	McRae, Ga.	A. W. Anders	Oakland
Casey, Ill.	James H. Staley	Maxwell	Manhattan, Kas.	D. C. Avery	Jeffery
Chestertown, Md.	J. H. Sides	Maxwell	Mondon, Mo.	J. H. Lucas	Cartercar
Cornish, Okla.	R. O. Dulaney	Maxwell	Milan, Mo.	Mock & Dodson	Cartercar
Cedar Rapids, Neb.	Meusborn Brothers	Maxwell	Manhattan, Kas.	The Whitelock Garage	Baker
Dixon, Mo.	R. L. Rolens	Metz			

the Buffalo truck. The firm will operate under the name of Electric Garage and Service Co.

**Spokane, Wash.**—Two new garages have recently been added to Spokane's motor row by the Hawkins Motor Car Co. and the Spokane Ford agency.

**Tacoma, Wash.**—C. L. Cliffe and W. F. Heath have dissolved their partnership in the Cliffe-Heath Machine Co. in Tacoma. William Heath will retain the Metz agency.

**St. Louis, Mo.**—H. W. Bartlett, well known in the trade here, has been made sales manager at the factory for the Universal Motor Co. of Washington, Pa., which is to manufacture the Universal car.

**Hartland, Wis.**—Frank Shermith of Hartland, Wis., who sold his garage a year ago, will re-engage in business and is making plans for the erection of a new fireproof building to be ready March 15.

**Moundsville, W. Va.**—The firm of Trimble & Johnson of Moundsville, has purchased from W. D. Alexander a site fronting on Jefferson avenue, on which it will erect a one-story building. It will be used as a motor car and machine shop.

**Detroit, Mich.**—George Bell, formerly general sales manager of the Esterline Co., is now manager of the Detroit branch of the Remy Electric Co. E. F. Willett, former manager, having resigned to assume a new position.

**Kansas City, Mo.**—The McGraw Tire and Rubber Co. of East Palestine, O., has opened a direct factory branch to cover the entire southwest territory at 1516 Grand avenue. The new firm will bear the name of the Kansas City Tire and Rubber Co. For the present no retail business will be done there.

**Minneapolis, Minn.**—The McArthur-Zollars-Thompson Co., 1301 Nicollet avenue, selling the Westcott, Richmond, Meteor and C. A. C., has changed its name to the Minneapolis Auto Co. A. E. Thompson is president of the company and treasurer, F. J. McArthur

will be vice president and G. Van R. Thompson, secretary. The first two are northwestern pioneers in the business, Mr. Thompson at one time handling the Studebaker Corp. branch in Minneapolis.

**Columbus, O.**—The Spring Street Garage Co., 60 East Spring street, has taken the central Ohio agency for Swinehart tires.

**Columbus, O.**—D. C. Cain, manager of the Patterson garage, 381 South Fourth street, has added an electric charging plant to the equipment of the garage. Associated with him are Herbert Cavendish and Elmer Snyder.

**Massillon, O.**—Plans are completed for the removal of the frame structure at 121 North Erie street, and the erection thereon of a fire-proof garage. William F. Wagner is at the head of the project. He has taken a 10-year lease on the site.

**Los Angeles, Cal.**—To handle the Los Angeles-made Perfex delivery car exclusively, the Perfex Sales Co. opened quarters last week at 1148 South Olive street. The firm is composed of J. Crick and R. E. Tierman.

**Columbus, O.**—The Motor Supply Co., 23 East Long street, has been sold to the Motor Supply and Tire Co., which will occupy a new building being constructed at 128 East Gay street, about April 1. A. I. Fishbaugh is manager of the new company.

**St. Louis, Mo.**—The Independent Auto Repair Co. was formed here last week to operate a downtown repair shop. Archibald Chisholm and James De Courcy, formerly of the Maxwell and Marion agencies, are the incorporators.

**Chicago**—J. J. Martin, formerly with the Commerce trucks, has recently joined the sales force of the Stewart Motor Corp. of Buffalo. Mr. Martin will maintain headquarters in Chicago and have charge of the territory of Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota, North and

South Dakota, Iowa, Nebraska, Missouri, Kansas, Oklahoma, Colorado, Texas and Kentucky.

**Toledo, O.**—Papers have been filed with the secretary of state increasing the authorized capital of the McNaull Auto Tire Co. of Toledo, from \$75,000 to \$175,000.

**Columbus, O.**—R. E. Merrell, formerly with the Columbus Buggy Co., has been made manager of the Franklin Cycle and Supply Co., 142 East Gay street, agent for the Cole. He succeeds P. A. Vogle.

**St. Louis, Mo.**—The Johns-Mansville accessory store will open in St. Louis early in March on Locust street. This store will be one of about fifty that are being installed throughout the country and Canada. R. E. Campbell will manage the local J-M service plant.

**Milwaukee, Wis.**—The Firestone Tire and Rubber Co., an Ohio corporation capitalized at \$50,000, has filed articles and a statement to do business in Wisconsin as a foreign corporation. The local interest is given at \$1,600 and the headquarters at Milwaukee. The company recently established a direct factory branch in Milwaukee, at 456 Milwaukee street.

**Lima, O.**—The Thomas Motor Co., 233-235 S. Main street and 113 East Elm street, has sold the garage business, machinery and supplies to Dale Armentrout, and hereafter the garage will be known as the Standard Garage. Mr. Armentrout has been in the employ of the Thomas Motor Co. for the past 3 years as foreman of the repair department.

**Kansas City, Mo.**—The agency for Missouri, Kansas and Oklahoma for the Hood tires made by the Hood Tire Co., of Watertown, Mass., has been placed with the Rubber Tire Repair Co., 915 East Fifteenth street. The company will act both as a wholesale and retail branch. The manager is H. A. Winters.

## Recent Agencies Appointed by Motor Car Manufacturers—Continued

### PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
McPherson, Kas.	Talbot & Gilson	Baker	Shelbyina, Mo.	D. D. Stewart	Dorris
Minneapolis, Kas.	Gage Auto Company	Baker	St. Clair, Mich.	A. A. Stewart	Maxwell
Marion, O.	Abel Auto Co.	Mitchell	Salina, Utah	W. H. Brown	Maxwell
Moberly, Mo.	E. E. White	Baker	St. Anthony, Idaho	M. V. Cochins	Maxwell
Mound City, Ill.	W. T. Kennedy	Maxwell	Salt Lake City, Utah	Siegel Auto Co.	Maxwell
Mt. Pleasant, Utah	E. Johnston	Maxwell	Sacramento, Cal.	W. J. Mannix	Maxwell
Minneapolis, Minn.	Stimson Automobile Co.	Briscoe	Spokane, Wash.	C. H. Hornburg Automobile Co.	Maxwell
Minneapolis, Minn.	C. & S. Motor Car Co.	Lambert	Santa Monica, Cal.	Harry A. Stevens	Maxwell
Mt. Carroll, Ill.	W. A. Spencer	Hupmobile	Spokane, Wash.	Inland Motor Car Co.	Oakland
Meridian, Tex.	Odle & Adams	Maxwell	Seattle, Wash.	Aldrich Cyclecar Co.	Dayton
Mooresville, N. C.	Fred H. Freeze	Hupmobile	Springfield, O.	King Garage	Studebaker
Meyersdale, Pa.	Meyersdale Auto Co.	Maxwell	Spokane, Wash.	Inland Motor Car Co.	Oakland
Malone, N. J.	Burt Brown	Maxwell	Seattle, Wash.	Olympic Motor Car Co.	Saxon
Madera, Pa.	Curry & Boone	Maxwell	Sapulpa, Okla.	Samuel Carshon	Cartercar
New Haven, Conn.	Burns-Thomas Co.	Hupmobile	Sentinel, Okla.	Bolon Bros.	Cartercar
New Castle, Pa.	Lawrence Automobile Co.	Maxwell	Smithville, Mo.	E. C. Colley	Cartercar
Newark, N. J.	F. K. Crowley	Maxwell	Spickard, Mo.	Wilson & Wilson	Cartercar
Nashville, Tenn.	R. D. Ezell Auto Co.	Maxwell	South Shore, S. D.	Klix & Stamocher	Maxwell
New Bloomfield, Pa.	James Miller	Maxwell	Shelbyville, Ky.	Guy S. Wells & Son	Hupmobile
Norton, Va.	Charles Johnson & Co.	Maxwell	Stanford, Ky.	W. E. Glover	Hupmobile
New Liberty, Ia.	E. J. Puls	Maxwell	St. Joseph, Mo.	Seiden-Maxwell Company	Baker
Neligh, Neb.	Winn & Wilson	Maxwell	Springfield Mo.	Jess & Sturdy	Baker
New Canaan, Conn.	Edward A. Guthrie	Maxwell	Tiffin, O.	Philip H. Reif	Jeffery
Newberg, Ore.	L. M. Smith Garage	Maxwell	Thomasville, Ga.	B. H. Ingram	Oakland
New York	Gotham Motor Car Co.	Ohio	Tulsa, Okla.	Chapple Brothers Garage	Franklin
Newark, N. J.	Cyclecar Distributing Co.	Imp	Tulsa, Okla.	Clarence G. Eaton	Cartercar
Newark, O.	Auditorium Garage	Mitchell	Twinsburg, O.	George A. Deisman	Maxwell
Nowata, Okla.	S. H. Littrell	Cartercar	Truro, Ia.	Truro Automobile Co.	Maxwell
Oakland, Cal.	E. L. Peacock Auto Co.	Mercury	Upper Sandusky, O.	Longabaugh Brothers	Hupmobile
Orlando, Fla.	Palms Auto Co.	Maxwell	Uniontown, Ala.	R. P. Greer	Maxwell
Ogden, Utah	Becraft Auto Co.	Maxwell	Urbana, O.	Only Garage	Mitchell
Pocahontas, Ill.	E. R. File & Co.	Metz	Urbana, O.	Prince Garage	Studebaker
Park City, Utah	B. E. Hartwell	Maxwell	Valley Falls, Kas.	F. C. Lewton	Cartercar
Pittsfield, Ill.	Frank G. Turner	Maxwell	Wilkes-Barre, Pa.	John Zorzi	Hupmobile
Pioneer, O.	C. A. Detiz	Maxwell	Wilburton, La.	Putman Brothers	Hupmobile
Pocatello, Idaho	Mooney & Huff	Maxwell	Winchester, Mass.	Mystic Valley Garage	Hupmobile
Ponca, Neb.	W. E. Andrews	Maxwell	West Salem, O.	Leroy-Smalley Auto Co.	Hupmobile
Parsons, Kas.	C. E. Ervin	Baker	Waxahachie, Tex.	Tom C. Grimland	Maxwell
Pittsburg, Kas.	Mayhew & Mumim	Jeffery	Westside, Ia.	Patterson & Campbell	Maxwell
Polo, Mo.	J. B. Van Olinda	Cartercar	Winfield, Ala.	Stalcup Hollis & Co.	Maxwell
Portland, Ore.	Harry L. Keats	Saxon	White Plains, N. Y.	White Plains Garage Co.	Maxwell
Pottsville, Pa.	Joseph Davenport	Maxwell	Washington, D. C.	Potomac Motor Car Co.	Ohio
Patterson, N. J.	Cyclecar Distributing Co.	Imp	Washington C. H.	Moore & Jamison	Paige
Quebec, Can.	Dorval & Posnosot	Peugeot	Wapakoneta, O.	Hauss & Bitter	Studebaker
Richwood, O.	W. H. Conboy	Maxwell	Wellington, Mo.	John Gausman	Cartercar
Rockville, Ind.	Claude L. McCampbell	Maxwell	Waynesburg, Pa.	Hoover Auto Co.	Oakland
Sheboygan, Wis.	E. & H. Motor Co.	Packard	Zanesville, O.	W. F. Roberts	Mitchell



# Manufacturers' Communications



## Batteries That Do Not Hold Their Charge

CLEVELAND, O.—Editor Motor Age—The most frequent complaint with respect to batteries both from dealers and car owners is, "My battery will not hold the charge." When the battery in question is examined by an experienced battery man, the owner almost invariably is met with the statement, "All your battery needs is proper charging." The owner, in the majority of cases, could have been advised by the battery man just why his battery needed charging; and by inserting an ampere-meter in the charging circuit and ascertaining how much current was going into the battery at 15 miles per hour, the owner could have been saved considerable inconvenience. The machine should be generating at least the lamp load at this speed of the car. Inasmuch as the above statements are an enigma to the man owning the battery, an explanation of the causes and effects involved in the complaint may be timely.

### Cause of Lost Charge

Lack of general knowledge of the characteristics of storage batteries, on the part of both dealers and owners, is responsible for their universal neglect; and nobody worries until the battery "will not hold the charge." Except in rare instances, this condition is directly due to undercharging the battery continuously. Insufficient charging may arise from a variety of causes. In some cases batteries are some time in transit, necessarily without charging during this period, and when they are received by dealers with new cars, many do not understand the importance of giving them necessary recharging. They may also remain on the showroom floor and be used for frequent demonstration of the starter without running the motor and charging generator long enough to give the battery any appreciable amount of current. In some instances, batteries that have stood in cars on a showroom floor from 1 to 3 months, are delivered to the purchaser without any attention or recharging; and while even in such condition, the battery may give service for a few weeks, it is only a short time until the owner complains that his battery "will not hold the charge."

This undercharged condition also can be brought about by other causes. It is possible for the generator to be out of order and fail to deliver current, or a break, or ground, in the circuit may prevent the generated current from reaching the battery. The service demanded from a lighting and starting system may also

be abnormal and cause this condition. For example, a physician or business man may drive short distances and make many stops. In this case, the demand on the battery for starting is heavy, while the generator is not run long or fast enough to replace more than a small part of the current taken from the battery. The same condition may be brought about by using the car largely at night, in which case the lamp demand is heavy, while the mileage and speed are not sufficient to replace the current used from the battery. In other cases there is a constant discharge from the battery when the car is not used, and at the end of a week or 10 days the battery is nearly exhausted. Under such circumstances the current furnished by the generator under normal driving conditions is not sufficient to supply everyday needs and at the same time build the battery up to its maximum state of charge. The consequence is that it becomes exhausted.

At this point the battery usually is removed from the car and taken to somebody for recharging. Most electricians, or garages, will charge the battery over night, or for 24 hours at most, and the battery is put back on the car. Unless the previous neglect has decomposed the separators, causing one or more short circuits, it seems to work all right and the owner is pleased. But within a few days the battery again is down and out. Now the owner is certain that he has a defective battery. His lights are very dim, the starter will not turn the engine over, and he writes the manufacturer of his car or the manufacturer of his battery at great length, demanding a new battery forthwith.

### Battery Compared with Man

The real fact in all such cases is that there is no fault whatever in the battery itself, but it is literally starved. To make this clear let us compare a battery with a man. A man is able to perform a certain amount of work as long as he is getting the necessary amount of sleep and food. If he is gradually deprived of either, his powers will become less and less and the work he is able to accomplish will be reduced in the same ratio. An abnormal amount of sleep and food will bring a starving man back to an efficient condition, providing his vitality has not been run down too low. In the same manner a starving battery may be brought back to a condition of efficiency by prolonged charging with electric current. In both cases the services of an expert doctor are required. The battery doctor puts the battery on charge at a very low rate that

will not cause it to heat above 100 degrees Farhenheit at any time, and continues the charging, testing the gravity of the electrolyte at frequent intervals by means of a hydrometer syringe. If, after 2 or 3 days of continued charging he finds that the gravity still is below normal and still is rising, he keeps on charging until he fails to get any higher gravity reading in any cell. In some cases the rejuvenation of a battery can be accomplished in a few days, but in aggravated cases it may take from 10 days to 3 weeks continuous charging to bring back the normal capacity of the battery.

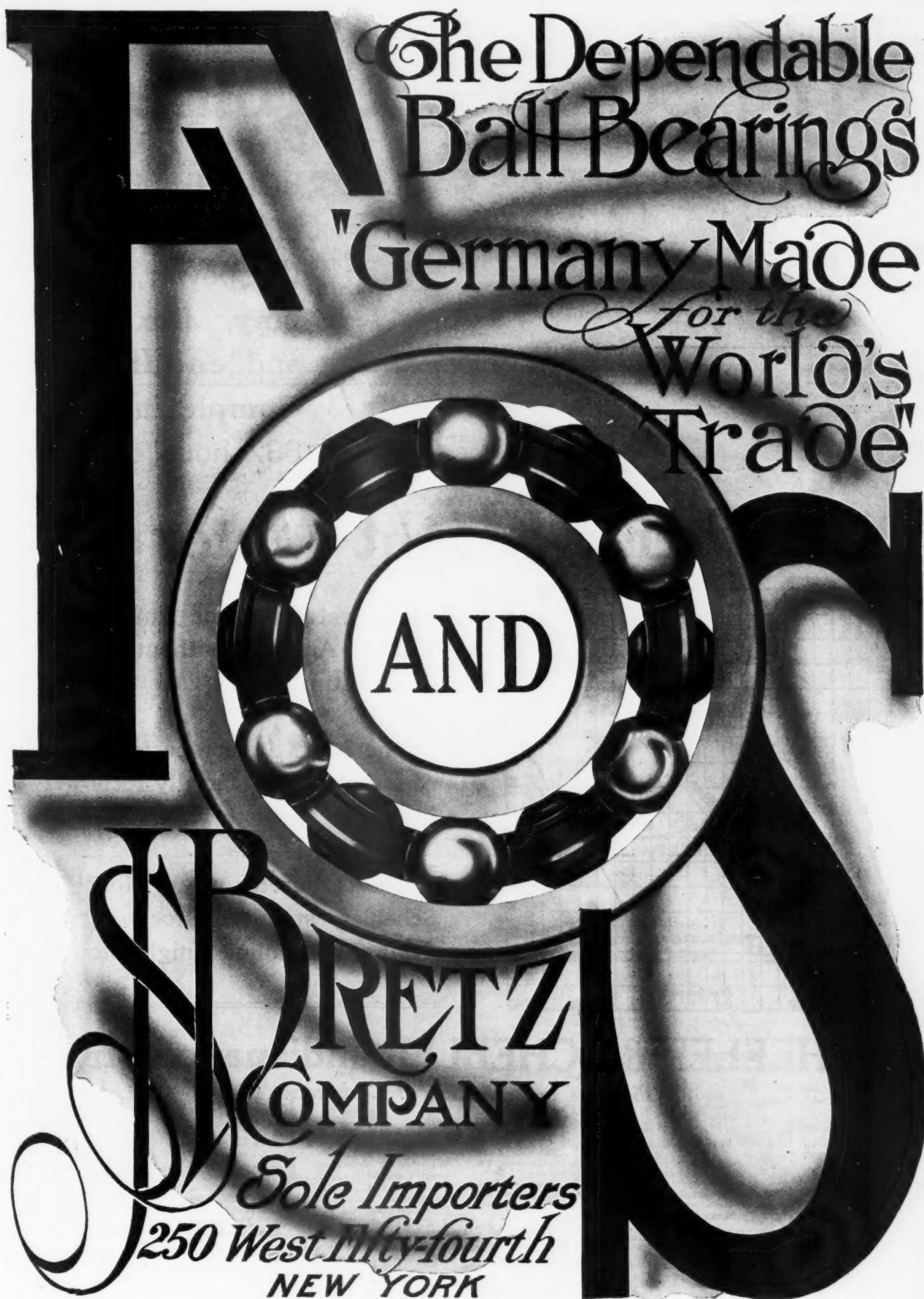
### Sometimes Can Be Rejuvenated

It must be borne in mind, however, that while the battery may give good service for perhaps a long time, a certain percentage of its life has been sacrificed, just as the emaciated condition of a starving man reduces his constitutional powers and shortens, by a certain percentage, the term of his life.

With batteries, as with nearly everything else with which we deal in this world, "an ounce of prevention is worth a pound of cure." A wise motor car owner will buy a hydrometer syringe and learn how to use it. He will make tests of the electrolyte in all cells at least once, and preferably twice, each month, and if he finds any cells reading below 1,250, he will see that the battery gets enough extra charging to bring the gravity up to a maximum of 1,275 to 1,300 in all cells of the battery.

If the battery is not too badly undercharged this can be best done by driving the car a long distance at a good rate of speed, or by running the motor in the car with the car standing idle. If, however, the condition requires an unusual amount of charging, it will be necessary to remove the battery from the car and put it in the hands of a battery doctor for the necessary reforming charge. If the doctor is a quack, or lacking in knowledge of his business, he may half-charge the battery and then, because the gravities do not come up to normal, dope the low cells with higher acid solution to make them give the correct reading. Such treatment will further aggravate the condition of the battery.

To sum up the whole matter, a storage battery is electro-chemical, and not mechanical. It must not be treated as one of the mechanical parts of the car. It needs little attention, but it must have that little, and must have it regularly and systematically.—H. S. Bentley, Manager of Agencies, Willard Storage Battery Co.



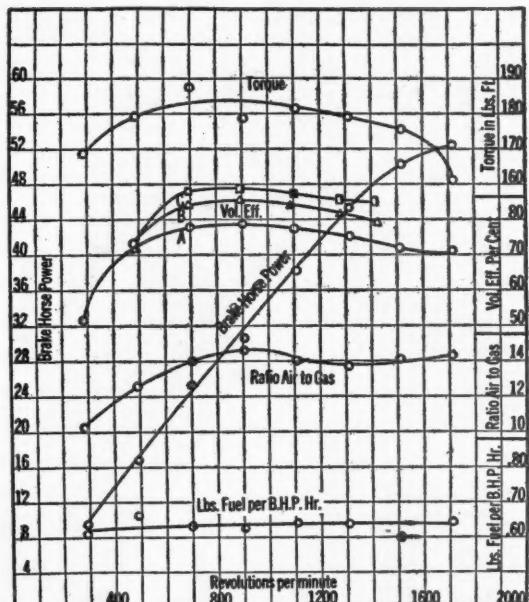
When Writing to Advertisers, Please Mention Motor Age.

# The Schebler Carburetor



officially breaks all world's records for power, economy, flexibility and endurance. Completing the 337-hour test of

## Moline-Knight Motor



in laboratory of the Automobile Club of America, without change of adjustment.

The most perfect performance of a carburetor officially recorded in gas engine history.

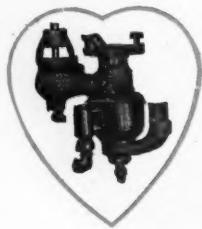
The carburetor was a Model R Schebler, standard stock equipment of the Moline-Knight Motor.

## WHEELER & SCHEBLER, Indianapolis, Ind.

*"Pioneers in Perfection of Carburetion"*

BRANCHES:

Fry & McGill Motor Supply Co. . . . .	Denver, Colo.	Pennsylvania Rubber & Sup. Co. . . . .	Cleveland
Automobile Accessories Co. . . . .	Pittsburgh, Pa.	Wheeler & Schebler . . . . .	Chicago
Ferris-Dunlap Auto Supply Co. . . . .	Dallas, Tex.	Wheeler & Schebler . . . . .	Detroit
Interstate Electric Co. . . . .	New Orleans, La.	Fred Campbell . . . . .	St. Louis, Mo.
Reinhard Bros. Co. . . . .	Minneapolis, Minn.	W. J. Connel . . . . .	Boston, Mass.
Manufacturers' Supplies Co. . . . .	Philadelphia, Pa.	Equipment Co. . . . .	Kansas City, Mo.
Weinstock-Nichols Co. . . . .	Los Angeles, Cal.	Elyea-Austell Co. . . . .	Atlanta, Ga.
Fairbank's Morse & Co., Ltd. . . . .	London, England	J. C. Nichols . . . . .	New York City
Canadian Fairbank-Morse Co. . . . .	(All principal Canadian Cities)	Weinstock-Nichols . . . . .	San Francisco



## "MY NEW CAR WAS EQUIPPED WITH AN 'ELECTRIC HORN'

I have just found out that 'electric horn' does not mean Klaxon.

When I first took my car out I drove it thru the city streets. I tried the horn. It made a little buzzing sound. Even though I sounded it repeatedly, I couldn't make any one hear it until I was almost on top of him.

I nearly ran down some children who were playing in the street. The horn was practically of no use.

When I got home I tried to find out what kind of a horn it was. It was hidden under the hood. It had no name plate.

Yesterday I got a Klaxon. I know now the difference between that 'electric horn' and a Klaxon. Some people may object to the unpleasant noise that the Klaxon makes. But I don't want to play music. I want a signal that will always be heard—that will really warn people and get them out of the way safely.

The Klaxon does it as nothing else can."

Excerpt from letter from  
Mr. C. S. Trowbridge of  
Montclair, New Jersey.



Lovell-McConnell Mfg Company Newark, N.J., U.S.A.

**KLAXON**  
*"The Public Safety Signal"*



KLAXON



*National*

—the car you can safely buy over the telephone

You, your wife or your daughter can step to the telephone, call up a *National* dealer and say: "Deliver a *National* to my address"—

You can do this with the same confident knowledge that you are sure to get just what you want that you can when you order anything else you *know is right*, because you know the reputation of the manufacturer and the product.

You can buy a *National* without lifting the hood. You can ride in a *National* without worrying about the separate mechanical parts. Our own engineers have that responsibility and there is fourteen years of *National* success and *National* stability in your purchase, whether you make it by telephone or in person.



#### ***National Six***

Here is the new *National* Six—the car that wins the heart of everybody who looks at it. The most comfortable car you ever rode in—impressing you always with the *National* strength, reliability and sureness of service, to say nothing of the celebrated *National* reserve force which gives you speed when you demand it. Motor  $3\frac{3}{4} \times 5\frac{1}{2}$ ; 132-inch wheelbase; electric starter and lights; left side drive, center control; complete in every detail, fully equipped, \$2375.

#### ***National 40***

This is our staple car—our highest achievement. Five models, \$2750 to \$3400. Motor  $4\frac{1}{8} \times 6$ ; electric starter and lights; a most luxurious and dependable car—The World's Champion.

*Write today for illustrated catalog*

**National Motor Vehicle Company, Indianapolis, Ind.**



**Competitors  
Have Quite Successfully Copied the**



TRADE MARK REGISTERED  
*Licensed Under Basic Patent for Treated Wood Separator*

### **1912 Battery**

and are now busily engaged in trying to imitate our 1913 type.

However, the copyist must, of necessity, be always behind, and it is our experience that the storage battery copier is never less than an entire year back in the wake of the **ELBA**.

The original, the pioneer among storage batteries for use with electric lighting and starting equipment on gasoline cars is the **ELBA**.

Always strictly up-to-the-minute, the **ELBA**, in performance, leaves nothing to be desired.

Our manufacturing facilities insure a volume of output that may be relied upon for prompt deliveries when utmost promptness is a vital consideration.

We have no old "chestnuts" to dispose of or work off on unsuspecting purchasers, and when you buy the **ELBA** you secure the last word in starting and lighting batteries.

**WILLARD STORAGE BATTERY CO., Cleveland, Ohio**

New York Branch: 136 West 52d Street

Detroit Branch: 736-738-740 Woodward Avenue

Indianapolis Branch: 438 and 439 Indiana Pythian Bldg.

Service Stations in All Principal Cities in the United States, Canada and Mexico

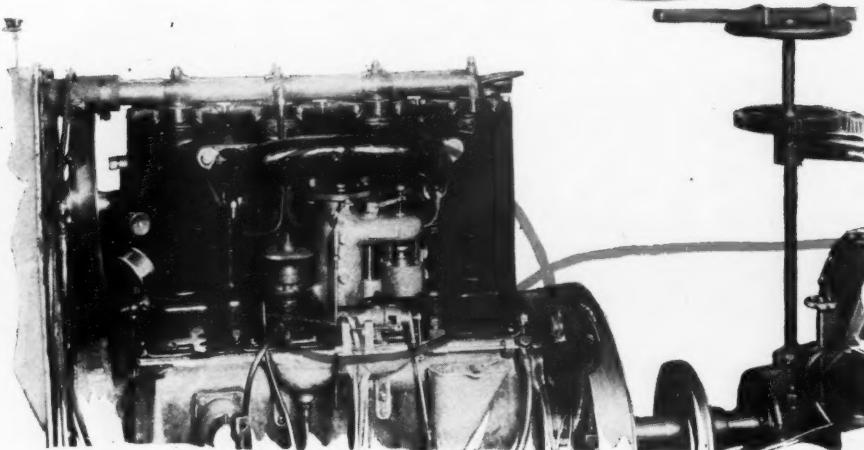
Chicago Branch: 2241 Michigan Avenue  
San Francisco Branch: 243 Monadnock Bldg.

(87)

February 19, 1914

# Russell-Knight Motor Finishes 300-Hour Block Test

Canadian Engine Shows Low Fuel and Oil Consumption



RUSSELL-KNIGHT WHICH MADE GOOD SHOWING IN 300-HOUR BLOCK TEST

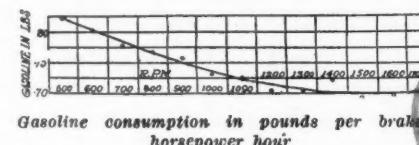
A SEMI-OFFICIAL, continuous, 300-hour block test of a Canadian, Russell-Knight four-cylinder motor of  $4\frac{1}{8}$  by  $5\frac{1}{8}$  inches bore and stroke, at different speeds each 24 hours showed a total oil consumption of 54.8 gallons and an average brake horsepower of 35.6. The latter figure was made covering all speeds from 500 to 1,700 r. p. m. and is 31 per cent more than the motor's rated horsepower of 27.2. The figures given summarize the results of a test supervised by Prof. H. W. Price, of the University of Toronto and conducted by the Russell Motor Car Co., Toronto, Can.

The motor, similar to that used in Russell cars and proven stock in every respect including the equipment, such as fly-wheel starter, generator, power air pump, etc., was placed on the block February 14 and operated at 500 r. p. m. After 24 hours this was increased to 600 r. p. m. and each 24 hours thereafter an increase of 100 r. p. m. was made until 1,700 r. p. m. was reached. It was held at 1,700 r. p. m. for 12 hours.

The motor stopped but once during the entire run and then for a period of 51 minutes, not due to motor fault, but be-

cause the room in which the test was conducted became flooded with water which almost completely submerged the engine. No adjustments were made from start to the finish of the 300 hours, the only parts to be touched being the spark plugs, the gaps of which burned off. The replacement of the plugs did not necessitate stopping the engine, and no allowances were made for power variations due to the poor plugs. The carburetor used was a Stromberg, type D, and the magneto a Mea, type BK-4.

The outlet water temperature was held at 140 degrees F during the test by with-



drawing hot water from the radiator and adding cold water to fill. At no time during the test did the outlet water rise more than 22 degrees above the inlet water temperature. The exhaust gas during the

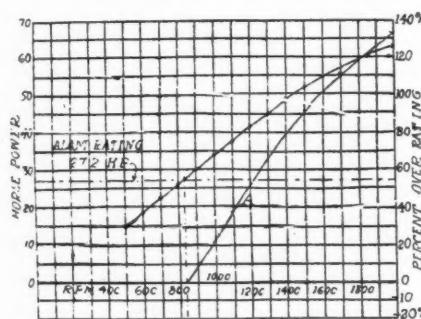
### PARTS OF RUSSELL MOTOR SHOWING SLIGHT CARBONIZATION

first 24 hours but rose gradually to the 1,400 r. p. m. mark and then dropped slowly with further speed increase. The gasoline used in the test was of 65 degrees Baume and the fuel consumption for the 300 hours was 1,299 gallons.

#### Supplementary Tests.

After the 300-hour run it was found the top ring in head of cylinder No. 2 had chipped and caught the top of the inner sleeve, breaking a piece out of it. New parts were put in and a number of one-hour runs were made at speeds of from 500 to 1,700 r. p. m., being increased by 100 each time. A 5-minute test at 2,000 r. p. m. was also made. At this speed the power was 233 per cent of the rated horsepower and it was shown that the maximum horsepower would not have been reached before 2,500 r. p. m. The torque at 2,000 r. p. m. was the same as at 700 r. p. m.

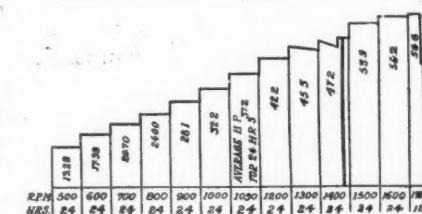
After the completion of all tests the starter and power air pump were tried and found to do their work properly. With all the parts tried the motor was torn down and the inner parts examined. The exhaust ports in the sleeves showed a  $\frac{1}{2}$  inch carbon deposit around the edges and the piston head had a slight carbon deposit also.



Curves showing the percentage greater horsepower of the Russell-Knight motor, than the 4. L A M rating which is 27.2. The curve A shows the percentage difference at the various speeds and the unmarked curve is the horsepower curve as obtained on the block.

test was practically free from smoke. Oil was maintained at a mean temperature of about 140 degrees F and it was necessary to water-cool the bottom of the oil pan to keep the oil at that temperature. For short intervals the oil showed 154 degrees. During the 1,300 r. p. m. run a gradual reduction of power was noted, for which no satisfactory explanation can be given.

The torque rose abruptly during the



Step chart showing the average brake horsepower during each 24-hour run. The break in the chart during the 1,400-hour period was due to the temporary shutdown due to the flooding of the test room, submerging the motor and causing it to stop

# (300-HOUR WORLD'S ECONOMY) RECORD BROKEN by



#### STROMBERG SMASHES RECORD IN FACE OF MOST ADVERSE CONDITIONS

The laboratory in which this 300-hour test was conducted was equipped with an automatic sprinkler system. During the 19th hour of the test the heat from the exhaust pipe caused a sprinkler head to blow out, submerging engine, men and records with water. The STROMBERG Carburetor, despite the fact that it had been flooded with water, resumed its task without being removed or having a single change made in its adjustments.

This record-breaking performance of the STROMBERG is all the more remarkable when it is considered that the carburetor was handicapped throughout by faulty spark plugs. The STROMBERG, for that reason, was unable to show the full power it would have been capable of producing had the ignition been perfect. No allowance was made for what might have been recorded with plugs in good condition.

#### FUEL CONSUMPTION DATA JUSTIFIES STROMBERG'S "MAXIMUM ECONOMY" CLAIM

This is a new 300-hour world's economy record—an average fuel consumption of .727 lbs. per brake h.p. hour—or only 4.33 gallons per hour. Professor Price's record reads, "Gasoline consumption was unique. The gasoline economy was excellent at 500 r.p.m., and is beyond all previous records known to the writer for automobile engines of equal stroke volume at 1500, 1600 and 1700 r.p.m." STROMBERG'S right to be called the carburetor of maximum

economy and flexibility was by this test most conclusively proven.

#### FROM IDLING TO 50 MILES PER HOUR WITHOUT CARBURETOR ADJUSTMENT

Professor Price says in his report, "When tested for idling this engine idled as quietly at 180 r. p. m. (about 7 miles per hour) as it ran steadily when pulling 56 h. p. at 1600 r.p.m. (about 50 miles per hour), with no change in carburetor adjustment." It will be noted that power was not sacrificed to economy. "The motor averaged double its rated h.p., or 54.4 h.p., for the last 72 hours of the run."

#### STROMBERG ENABLES MOTOR TO DEVELOP 233% OF ITS RATED HORSEPOWER

At a speed of 2000 r.p.m. (about 70 miles per hour), the STROMBERG Carburetor, with adjustments unchanged, delivered a mixture of highest economy and power, making it possible for the motor to develop 233% of its rated horsepower—and this after a gruelling run of 300 hours!

#### TEST PROVES STROMBERG DELIVERS A "CLEAN-BURNING" MIXTURE

The fact that after the run the motor showed a carbon deposit which was almost negligible, was due to the uniform, clean-burning mixture fed the motor by the STROMBERG. Economy—Power—Flexibility—a minimum carbon deposit

—are all features of STROMBERG Carburetors, which are capable, without adjustment, of delivering a just-right mixture at any speed. Stromberg Carburetors in everyday service give results identical with those brought out in this test.

*This Was a Stock Carburetor—No Stromberg Representative Was Present to Make Preliminary Adjustments of Any Kind.*

**Write us for Further Reasons Why Your Car Should be Stromberg Equipped**

**Stromberg Motor Devices Company**  
54 E. 25th Street, Chicago, Illinois

**Polarine**  
FRICTION REDUCING MOTOR OIL

For motor cars, motor trucks  
and motor boats

**The world's finest lubricant**

Maintains the correct lubricating body at any motor speed or heat.

Always flows freely at zero temperature.

Polarine is the safe oil to use the year 'round, because it always penetrates to every friction surface. It is absolutely clean and of exceptional durability.

Protect your motor. It deserves the best oil. We have put into Polarine 50 years of experience in the making of lubricants for every kind of machine. We have studied every make of motor car ever built. We have vast resources and matchless facilities.

Reduce wear to the minimum—make your good car stay good. Use the winter-and-summer oil—Polarine. It adds life and power to every motor.

**STANDARD OIL COMPANY**  
(AN INDIANA CORPORATION)  
Makers of Lubricating Oils for  
Leading Engineering and  
Industrial Works of  
the World

[167]

**Red Crown Gasoline**  
Ensures Maximum Power

**1500 POUND SIGNAL MOTOR TRUCKS**

**"GUARANTEED ON SOLID TIRES"**



**\$1400**

*Chassis with Driver's  
Seat and Full  
Equipment*

Continental Motor  
Eisemann Magneto  
Stromberg Carburetor

**Signal Truck with Open Express Body  
and Canopy Top**

**\$1400**

*Chassis with Driver's  
Seat and Full  
Equipment*

Covert Transmission  
Russel Jack Shaft  
Hyatt Bearings

**These Specifications Will Interest You**

Timken Axles  
Gemmer Steering Gear  
Hartford Clutch

## **DEALERS WANTED**

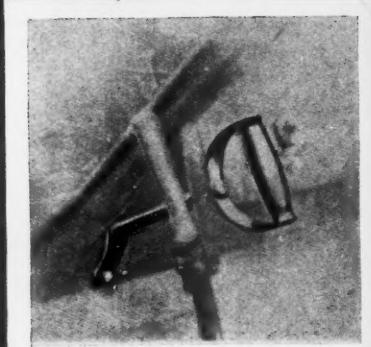
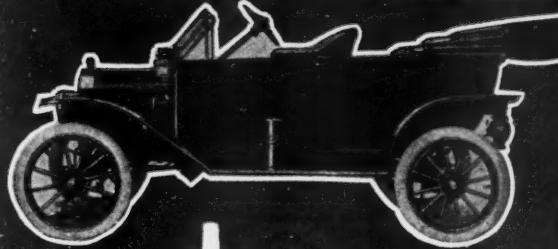
We desire to obtain high grade representation throughout the country for the Signal Truck and have a very equitable selling arrangement that will make you money.

The Signal is a thoroughly standardized job throughout and really is an exceptional selling proposition.

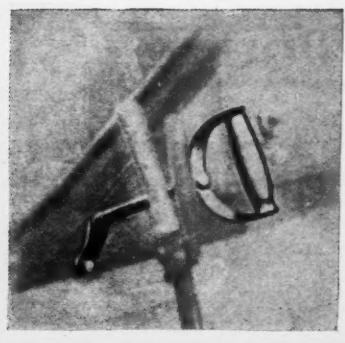
We are now making deliveries and have some good territory open. Write today.

**Signal Motor Truck Company, Detroit, U. S. A.**

# A Simple Problem in Automobile Mathematics



**=**  
**100% Efficiency**



**=83%**  
Efficiency  
*C*

**83% or 100%.  
WHICH DOES  
YOUR FORD  
CAR GIVE YOU?**

## THE BOSTON STARTER FOR FORD CARS

There is absolutely no reason in motordom why you shouldn't have a car that is up to the top-notch of efficiency. The compact, fleet-footed, useful FORD car lacks but one necessity—that is the BOSTON STARTER.

Don't be satisfied with only 83% efficiency when you can have 100%. Equip your car with the BOSTON STARTER.

The starting will mean simply the pulling of a handle. Doing this will start the motor every single time.

THE BOSTON STARTER is entirely a mechanical device; it has all the power of an

acetylene or an electric starter without their annoyance and expense; there is nothing to get out of order; the parts are few, simple and strong. The entire device is beneath the hood, except the handle, which is located on the dash.

See the BOSTON STARTER at our nearest representative's, or write for complete information.

**AUTOMATIC APPLIANCE COMPANY, 172 COLUMBUS AVENUE  
BOSTON, MASS.**

BALTIMORE, MD.,  
Robert W. Butler,  
4529 Park Heights Ave.  
CHICAGO, ILL.,  
Ford Supply Company,  
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LOS ANGELES, CAL.,  
J. R. Bradford,  
201 S. Bonnie Brae.  
NEWARK, N. J.,  
Ford Specialty Company,  
10 Bleecker Street.

PROVIDENCE, R. I.,  
William Burton,  
103 Bradford Street.  
SCHEECTADY, N. Y.,  
Dorp Auto Company,  
307 State Street.  
DENVER, COLO.,  
Bert E. Clark,  
1616 Broadway.  
SEATTLE, WASH.,  
L. E. Miller,  
101 Broadway, North.

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**HOLLEY**  
CARBURETOR

**In the Race**

for supremacy, the no-moving-parts Holley has won, because of its extreme simplicity.

The absence of springs, cams, balls and other old-fashioned and out-of-date devices for maintaining an accurate explosive mixture of gasoline and air, places the self-adjusting Holley in an entirely different category.

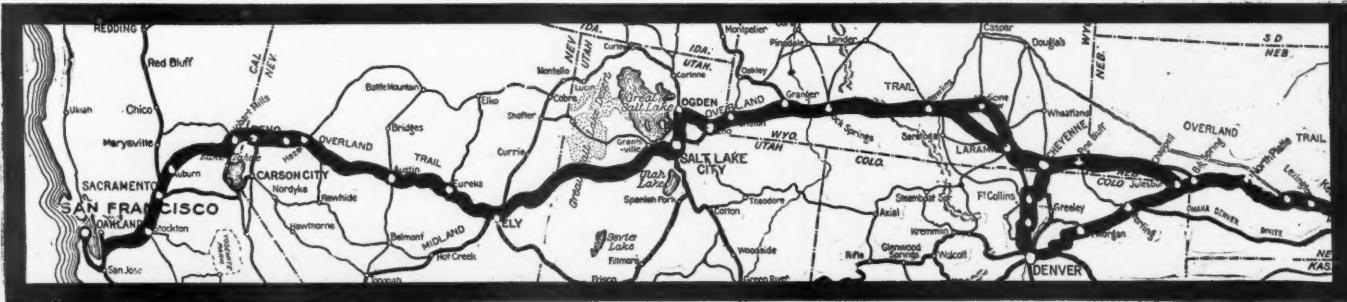
It is so efficient that it will save enough gasoline to pay for itself in 5000 miles of driving. The temperature regulator makes starting in cold weather easy.

Have a HOLLEY put on Your Car. If your garage man can't supply you, send direct to

**Holley Brothers Co.**  
Detroit,  
Mich.

When Writing to Advertisers, Please Mention Motor Age.

# VACUUM CUPS FIRST



J. Neil Patterson at the end  
of his ocean to ocean run  
on Vacuum Cup Tires.



In traveling order. Showing  
the car with load in place.

A bit of rough going  
that demonstrated  
Vacuum Cup fitness

Note: This trip was not made to advertise the tires used, and attention is called to the absence of advertising signs on the car.

I have completed a 6,357 mile trip across the continent. My overloaded car was equipped with PENNSYLVANIA OILPROOF VACUUM CUP TIRES, which gave service far exceeding any hopes I had at the start. We had seven punctures, due to unavoidable obstacles, but not a single blowout, two of the tires finishing with their original air. Considering the terrible condition of the roads, this is the most remarkable achievement ever attained by a set of tires. I make this voluntary declaration with 14 years' experience with almost every make of tires. The tires still are in excellent condition.

*J. Neil Patterson*



When Writing to Advertisers, Please Mention Motor Age.

# Over the Lincoln Highway



In the remarkable tire experience of J. Neil Patterson of Detroit, the first automobilist to cover the complete route of the Lincoln Highway since its dedication, is again demonstrated the remarkable service capacity of

# PENNSYLVANIA Oilproof VACUUM CUP TIRES

This trip—begun at San Diego and completed two months later in New York City, with an actual speedometer reading of 6,357 miles — was accomplished on a single set of *Oilproof Vacuum Cup Tires*. It is a triumph of splendid tire fitness over almost every adverse condition known to the motorist.

Not a single blowout occurred during the trip—despite the fact that the total weight of the car when loaded was 5,580 pounds—an overload of 580 pounds—and roads that varied from the needle shales of the upper Rockies to the half frozen clays encountered in a two-day blizzard just east of Denver.

Only seven punctures were taken in the five thousand miles, and each of these was traced to a nail or other metal object picked up in passing through the streets of towns.

New York City was reached with the original air—taken in at Los Angeles—still in two of the tires. And the wear upon the vacuum cups had been so little that these non-skid devices performed their function perfectly on the wet asphalt pavements of New York.

While this particular experience is recorded as a timely exposition of the sturdiness and upstanding wear resistance of Vacuum Cup Tires, and as a test whose conditions were carefully and continuously noted, it is by no means a Vacuum Cup performance of an extraordinary or exceptional nature. Every Vacuum Cup Tire is guaranteed for 4,500 miles. Thousands are in use today whose mileage has far exceeded this mark, and records of 12,000 to 15,000 miles on heavy cars are numerous.

It is because of this actual service—so often and so completely demonstrated as actual, not merely theoretical—that the most insistent and determined tire demand today is for Vacuum Cup Tires.

In a careful and practical preliminary survey of the 1914 dealer requirements there is already indicated a complete taking up of our trebled production for 1914.

Therefore, your orders at this time will not only assist us in giving you service but will be of great advantage to yourself in forestalling late deliveries.

Mr. Patterson's choice of Vacuum Cup Tires was influenced solely by their exceptional service on his previous tour in Mexico. He purchased the tires from regular stock in the Detroit branch.

# Pennsylvania Rubber Company

Pittsburgh, 505 Liberty Avenue  
Cleveland, 1921 Euclid Avenue  
Detroit, 254 Jefferson Avenue

PENN'S  
New York City, 1889 Broadway

**PENNSY**

**Atlanta, 25 Houston Street**

Boston, 735 Boylston Street  
Atlanta, 25 Houston Street

## Jeannette, Pa.

**Omaha, 215 South 20th Street  
Seattle, Armour Building  
St. Paul, 149 West 6th Street**

**YORK**  
Dallas, 2111 Commerce Street

Dallas, 2111 Commerce Street

25 Houston Street  
PEP COMPANY OF CALIFORNIA

Lodi, Calif. 93230 South Main Street

SAN FRANCISCO 160 South Street - LOS ANGELES 620 South Main Street

*An Adult at Convalescent Home*

*An Independent Company with an independent selling policy*

When Writing to Advertisers, Please Mention Motor Age

# Hupmobile



**"32" Touring Car or Roadster \$1050 f. o. b. Detroit**

*In Canada, \$1230 f. o. b. Windsor Factory*

EQUIPMENT—Electric horn; rain vision, ventilating windshield; mohair top with envelope; inside quick adjustable curtains; speedometer; cocoa mat in tonneau; gas headlights; oil side lamps; trimmings, black and nickel.

With regular equipment and additional equipment of two-unit electric generator and starter; electric lights; oversize tires, 33 x 4 inches; demountable rims, extra rim and tire carrier at rear. \$1200 f. o. b. Detroit.

*In Canada, \$1380 f. o. b. Windsor Factory*

## A Composite of the Best Engineering Authority

One of the things you noticed at the Show was the preponderance of the new style bodies, aptly christened the "Stream Line."

We were not clever enough to invent the name—we wish we were.

But our engineers were advanced enough to develop this type of body two years ago; and at the Chicago Show of 1912, the Hupmobile was the only car fitted with the stream line type.

Naturally it pleases us to see so many of our costlier and more luxurious brothers falling into line and advocating this style.

A feature, too, that probably impressed you was the almost unanimous tendency toward motors of the long-stroke type.

The Hupmobile vindicated the superior pulling qualities of that type of motor two years ago, and at the Chicago Show of the same date was the only car that exhibited the long-stroke design—with the exception of one or two makes that have since passed out of the market.

When you looked over starting and lighting equipments, you found the Hupmobile, as usual, in high class company.

Of the seventeen makes that you will see equipped with the same starting and lighting system as the Hupmobile, four of them belong to the costliest types; and every one of the others thus equipped is higher priced than the Hupmobile.

At the recent Paris and London Shows, six of the best known and most expensive cars manufactured in Europe were equipped with this same make of electrical equipment that the Hupmobile is using.

We mention these things as a convincing illustration of our claim that in every department of mechanical excellence, quality is considered first, regardless of price.

As a careful dealer who wants to give his customers the worth of their money, we feel sure that you will give every thoughtful consideration to the Hupmobile.

**Hupp Motor Car Company**  
1228 Milwaukee Avenue, Detroit, Michigan

**The Car of the American Family**

*When Writing to Advertisers, Please Mention Motor Age.*

# 30 minutes' hard labor pumping tires by hand reduced to 5 minutes' pleasure watching a Motor Pump do it better!

BUT it's more than a question of saving your labor and time, because the matter of always keeping just the proper amount of air in your tires means *saving half your whole tire expense!*

- A tire that is *not* properly inflated means—
  - wear of tire through bending of side walls;
  - wear of tire through undue strains close to rims, known as rim-cutting;
  - breaking of fabric through striking stones and sharp objects;
  - under inflation means increased "drag" of a flattened tire on the road—less miles per hour per gallon of gasoline—in other words, greater running cost per mile;
  - increased friction, causing great heat between inner tube and tread. This removes any patches on inner tube, and burns the life out of the tire;
  - and under-inflation means all the delays and annoyances arising because of these various troubles;
- A tire *properly* inflated reduces the chances of puncture.



There's nothing more heart breaking than to have to blow up a tire by hand on the road. And the last few pounds of pressure are the hardest of all. Usually you quit 15 or 20 pounds short of the proper pressure and run on under-inflated tires, which costs you money and more trouble later on.

The one thing that affords the greatest insurance against all of these tire troubles and expenses is an efficient Air Pump mounted on your motor and driven by your motor.

## A Real Stewart Air Pump \$15

### Stewart One-Cylinder Air Pump

This is mounted right on the motor. Simply throw over the lever and the pump operates instantly. Throw out the lever when tire or air starter is sufficiently blown up. The base of the pump is aluminum. The piston is steel, hardened, ground and lapped. Connecting rod is hardened steel. Cylinder is a finely machined piece of work, air cooled, with fins which insure perfect cooling. The piston rubs against an oil-soaked wick which supplies every bit of oil it needs, and yet prevents one particle of excess oil from getting into the cylinder. This wick projects outside, where oil is dropped on. The crankshaft is provided with a separate oiler. Base of the pump is open, so that should there be any free oil, it will drop entirely out of the pump. The air intake is screened so that no dirt can enter cylinder. There are two air valves as a double precaution against leakage or failure to work. There are no leather or rubber packings to wear and cause leakage. Its capacity is such that it will fill a 36-inch x 4½-inch tire in less than 4 minutes. Price with air pressure gauge and 13 feet of high grade connection hose, complete, only \$15.

### Stewart 4-Cylinder Air Pump

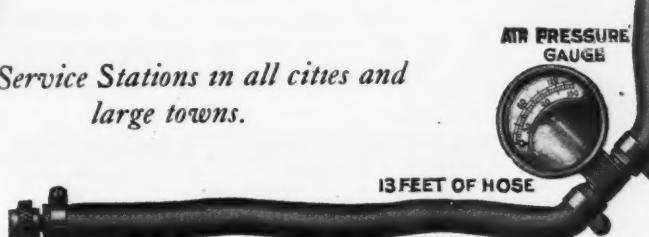
For those who want a pump with larger capacity we have designed a 4-cylinder model, with real motor bearings, steel pistons, drop forged crankshaft, hardened steel connecting rods, and a most satisfactory oiling system. No rubber or leather piston packings to wear out, but built like an automobile motor. Fins on cylinders assure perfect cooling. Complete, with air pressure gauge and 13 feet of hose, only \$25.

## Stewart-Warner Speedometer Corporation

Factories: Chicago, Ill., and Beloit, Wisc.

Branches	Atlanta	Indianapolis	Paris
Boston	Kansas City	Philadelphia	
Buffalo	London	Pittsburg	
Chicago	Los Angeles	St. Louis	
Cleveland	Minneapolis	San Francisco	
Detroit	New York		

And Service Stations in all cities and large towns.





## Learn About Motor Car Axles and Bearings These Books Will Help You *and they are Free*

THESE LITTLE BOOKS will tell you about motor car axles and bearings—how they are made and the many important things they have to do. You may have them for the asking. Both will be sent *free*, postpaid, on request to either Timken Company.

### TIMKEN PRIMERS on Bearings      on Axles FREE

We call these books Primers because they are written in plain non-technical language that anyone can understand. Whether you own a motor car or not, these books contain information that will some day be valuable to you.

#### Here are some of the subjects covered in the Timken Primer on Bearings

Importance of the bearings.  
The many different things that the bearings must do.  
Where to find the anti-friction bearings in a motor car.  
A B C of Timken Tapered Roller Bearings.  
How the Timken Bearing works. How it is made.  
A very important comparison of the principles of various types of ball and roller bearings.  
Care of bearings—lubrication and adjustment.

#### In a simple, human-interest way the Timken Primer on Axles tells:

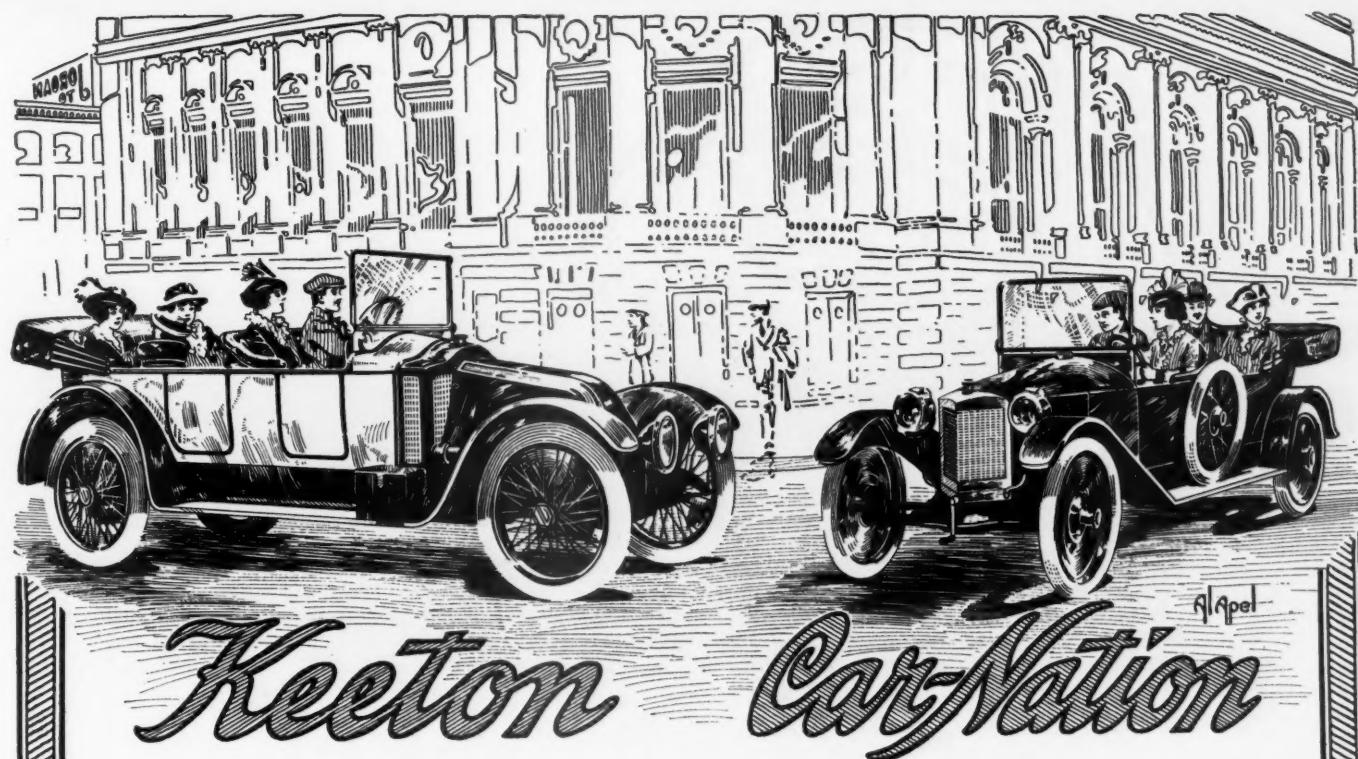
How life and safety depend on the axles.  
How the rear axle performs four distinct functions and is composed of several hundred separate pieces requiring thousands of operations to make.  
It tells how to lubricate, adjust and care for the axles.  
In separate chapters it takes up the front axle, the rear axle and axles for commercial cars. It explains full-floating, torque, action of the differential, of the brakes and many other things.

The Timken Primers don't try to sell you anything. Timken Axles and Bearings are sold only to motor car manufacturers to be incorporated as integral parts of their cars. The Primers will give you just the information you need to properly appreciate and understand the fundamentals of your motor car. They are free. Send for them today.



**The Timken-Detroit Axle Company**  
Detroit, Michigan, U. S. A.  
**The Timken Roller Bearing Company**  
Canton, Ohio, U. S. A.





# Keeton Car-Nation

## Each the Leader in Its Class

### "A Distinctive French Type"

The new Keeton Six is the only large high grade car that has been brought out in the last few years that is "different."

The general run of American built cars resemble one another very closely, and a casual glance will hardly distinguish one make from another.

The Keeton Six has that distinctive French type of construction that attracts your attention immediately.

Not only are the lines of the Keeton pleasing to the eye but the mechanical excellence of the working parts insures a maximum of use and endurance.

The quiet, powerful six cylinder motor—four speed transmission—improved cooling system—imported annular bearings and alloy steel throughout—wire wheels—long wheel base—in fact, the whole chassis represents the best in design, material and workmanship.

The price of \$3250 includes equipment that makes the Keeton complete in every detail.

### "The Car for the Nation"

The Car-Nation is a high grade, well designed, carefully built automobile with a four cylinder motor—sliding gear transmission—floating rear axle—in fact, all the features are standard.

In addition to all the features of construction and detail that are embodied in big, high priced cars—it has a "smart" appearance that sets it apart from the rest.

The V shaped radiator—stream line body—wire wheels, full fenders and aprons—comfortable seating capacity and many other details all combine to make the Car-Nation the leader in the small car class.

For general utility and economy it is unsurpassed—25 miles to the gallon of gasoline—exceptional tire mileage—easy to handle—fast and powerful—the Car-Nation is a splendid little car for all around use.

Dealers will write today about their territory.

Roadster, \$495. Touring Car, \$520, as catalogued.

*Write for "The Triple Test" Booklet*

**The American Voiturette Company, Detroit, U. S. A.**



## Are You on the list of Bosch Dealers

**W**E want every intelligent dealer who is building a permanent business—the dealer who wants a legitimate, positive profit—clear profit—without the necessity for cut-price clearance sales, to sell Bosch Magnetos and Plugs.

There is good profit and quick sales for every dealer who will take on the Bosch line. Bosch Magnetos and Plugs back up every claim made for them—they satisfy the customer and build business, not for today, but for many days that come. Legitimate profits with minimum efforts—that's the ideal line—the Bosch line.

Let's get together—we have a new 1914 price schedule ready for you—if you didn't get it, send for it. We want to get in touch with all the progressive firms who are in business to stay. Write us before you forget it.

*Over 150 Bosch Service Stations are now in force in United States and Canada*

**BOSCH MAGNETO CO., 214 West 46th Street, New York**

Chicago

Detroit

San Francisco

Toronto



# Detroiter

**\$925**

"Makes Life  
Worth Living"

**A sure sales-clincher that backs up every Detroiter dealer and guarantees a record breaking season for 1914**

**\$381**

The new 1914 Detroiter is stream line, bull-nosed, 32 horse power; with crowned fenders, dash control; finished more handsomely than ever in raven-blue and light blue "gun-wale" stripe. A car that competes with the most expensive 4's on the market. Write for the Detroiter proposition. The season is at hand—quick action's the word!

A tabulation that covers the twelve months from January, 1913, to January, 1914, and embraces every Detroiter car in operation (not a picked few), shows that the THOUSANDS OF DETROITERS NOW IN USE AVERAGE ONLY \$3.81 PER YEAR FOR REPAIR PARTS.

Such a sales-clincher has never before been offered a dealer by any make of car. It is a record made possible only by a method of building which is better and a design which has no equal among cars of this class.

**Dealers realize only too well the common weaknesses** of the popular priced cars. Those sagging axles, those stripped pinions, those vibration-racked motors, those frames and transmissions bumped half out of commission by poor spring suspension.

**The Detroiter full-floating rear axle is designed to** withstand 2000 pounds of overload. The platform rear spring needs no shock absorbers. The 32 horse power, long stroke motor, in comparison to the light weight of the car, is more powerful than even the big 60's, with their massive loads to carry.

**A COMPLETE LINE, \$850 TO \$1050**

**BRIGGS-DETROITER CO., 455 Holbrook Ave., DETROIT, MICH., U.S.A.**

# **Announcement!**

## **Rudge-Whitworth**

**Detachable**

## **Wire Wheels**

will hereafter be made for the George W. Houk Company by the Houk Manufacturing Company of Buffalo, New York—delivery to commence March 15th.

This will in no way effect the marketing of the Houk Wire Wheel now made by the Houk Manufacturing Company for the George W. Houk Company.

Owing to our largely increased manufacturing facilities new prices will be announced for Rudge Wheels early in March.

# George W. Houk Company

*Licensed Under Rudge-Whitworth*

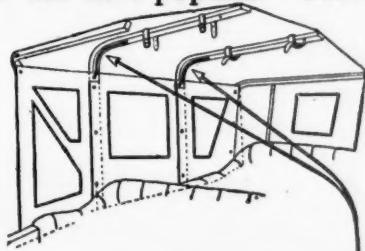
**Don't let your plans—social or business—depend upon the weather.**

With Collins Always-Ready Curtains you can come and go as you please—in your car—regardless of outside conditions. At the first sign of rain—Snap! Snap!—right in place slide Collins Curtains—and you're as snug as a "bug in a rug."

# Collins *Always Ready* Curtains

To get at Collins Curtains, you don't have to chase everybody off the rear seat—put on overalls and explore the cellar until you find some dusty crumpled-up curtains. They are always in plain sight, neatly rolled—not folded, and you can put them into service in the dark.

There is no cable or other operating mechanism on the Collins Curtains to interfere with the lowering or raising of the now popular "one-man-top."



They are now regular equipment on the Cadillac, Chalmers, Moline, Paterson, Winton, Stearns-Knight, Haynes, Cole, Pullman, Havers, Herreshoff, Jeffery, National, Lyons-Atlas, Apperson, Moon, Velie, Davis, Speedwell, Jackson, Pratt, Palmer, Stanley, McFarlan, Henderson, Kline, Lexington and Pope-Hartford.

If you are buying a new car, the manufacturer or dealer will put on Collins Curtains for you, if you specify them. To make your present car up-to-date any top builder can apply them for you at a moderate charge. The Collins attachment is adjustable to any top and to your old curtains.

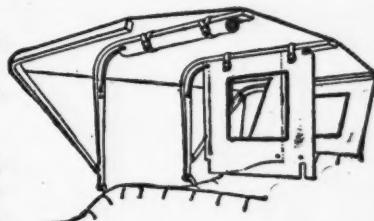
The Automobile manufacturers who provide for the convenience of the buyer, have Collins Curtains as regular equipment.

We license top manufacturers to furnish Collins Always-Ready equipment with new tops or to equip old tops.

To Ford Owners: We can furnish Collins Always-Ready Curtains for Ford cars.

There are some imitations and evasions of the Collins patents, which in some respects resemble Collins Curtains, but they do not have Collins advantages. Always look for the exclusive Collins curved bracket bar and the Collins license tag.

You can examine Collins Curtains at any of the display rooms of the cars having them



as regular equipment. We urge that you see them as soon as possible. Write us, and we will make the necessary arrangements. This obligates you in no way.

**Novelty Leather Works**      Dept. B  
Jackson, Michigan

# A Moral Obligation Fulfilled!

**\$1,750,000 was invested in a service for former Maxwell owners---this same insurance covers the 1914 Maxwell 25-4**

YOU WILL CONCEDE that any time a company invests one and three-quarters of a million dollars in service for former customers—it was only morally bound to protect—that concern has high business ideals.

THAT'S EXACTLY WHAT THE MAXWELL MOTOR CO. did when it absorbed the plants making the Brush, Courier, Everitt, Maxwell, Columbia, Stoddard-Dayton cars and the Alden-Sampson trucks.

WE DIDN'T HAVE TO DO THIS. We were in no manner whatever legally bound to do so. With the forming of the Maxwell Motor Co. (Inc.) the manufacture of the aforementioned cars ceased.

BUT THE SERVICE TO THE OWNERS did not stop. It cost us \$1,750,000 to see that these former customers got the utmost in service. It meant the turning over of our big New Castle plant, just when we needed it to supply the world-wide demand for the new Maxwells.

WE DID IT—We are doing it now. We are not speaking of our past—but of the present and the future. Those owners of cars made by the plants we acquired are now getting this service and will continue to get it as long as they want it.

IT IS THEIRS FOR THE ASKING. The enormous New Castle, Ind., plant of the Maxwell Motor Co. does nothing else but tend to the wants of our owners. It is daily giving the most expeditious and thoroughly satisfactory service ever devised by any concern.

YOU CAN'T EQUAL IT for location. The New Castle parts plant is situated in the very center of the ownership of Maxwell, Brush, Courier, Columbia,

Stoddard-Dayton cars. The central supply point of Maxwell service is just at the most 12 hours distant from the great majority of Maxwell owners.

PROMPT SERVICE IN EMERGENCY CASES means much to owners. It cuts down the upkeep. You know that. If you don't ask any owner what Maxwell service would have meant to him in several instances. And this service stays with Maxwell customers always.

ALWAYS? You say that's a long time. Well, it has been some time since the above mentioned cars ceased to be manufactured and their owners can get the most efficient service in the world by simply shipping his car to the New Castle plant for overhauling, or replace a part by ordering it from one of the Company's big service stations in the east, west or south if they desire instant service.

IF WE DO THAT MUCH for people we're not legally obligated to serve, what will we give you as a Maxwell owner we are bound to protect? The public knows what we have done and are doing. That's why we can't supply the demand for Maxwells.

PEOPLE WHO HAVE OWNED CARS and are buying again comprise the bulk of the Maxwell army. They know that this great company not only gives its owners the greatest service in the world but that it has equally great manufacturing facilities. They have heard the big men in the industry talk of the marvelous automatic, rapid, hair-line devices the Maxwell Motor Co. has for the making of its great automobiles. Appliances that other makers had only heard of but had never seen operate in the construction of the scientific automobile.

INFORMED BUYERS OF TODAY know that it would never be possible to make such a wonderful automobile as the Maxwell "25-4" and sell it for \$750 if it wasn't for almost magical manufacture. They realize that even with these scientific devices the price would have to be a \$1,000 or more for a Maxwell "25-4" if it wasn't for the quantity marketed. The combination of improved manufacture and enormous distribution makes possible a real automobile for \$750.

NOT ONLY A REAL ONE but the "biggest" real motor car in the world. It is conceded that the Maxwell "25-4" is deserving of that title. Not by mere size—but because of sheer car value. "Biggest" because it will do bigger things than higher priced cars at less cost. There is the real reason why we can't make enough of these wonderful automobiles to supply the universe.

SO LIGHT THAT IT cuts the tire bills almost in half and yet so strong that it will stand up under the abuse the average owner will give it, the Maxwell "25-4" is the car that the big experienced buyers have been looking for. That is why they were so eagerly snapped up by the world. That is why you are going to get left if you don't get your order placed at once.

THIS WONDERFUL MAXWELL will bring premium prices before the summer demand is supplied and don't forget that. If you want to make sure that you get the "biggest" automobile in the world at a price never thought possible get in line right now.

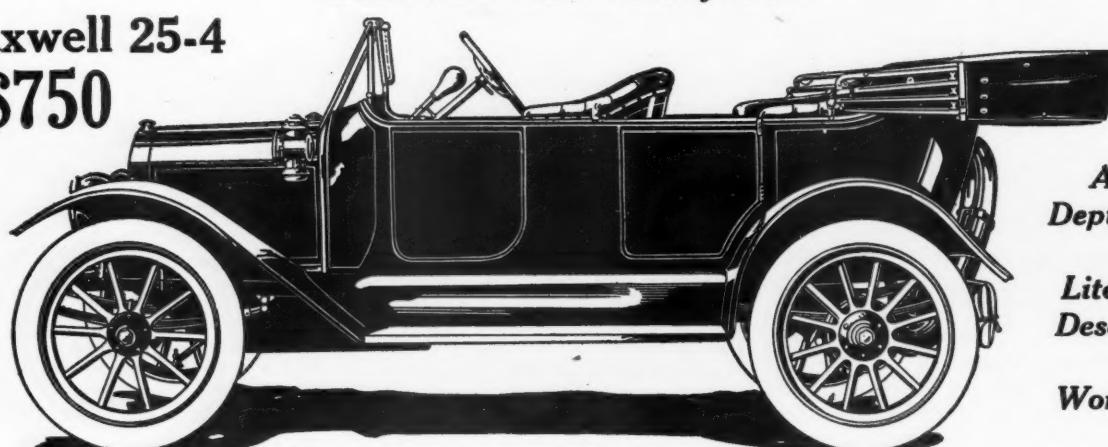
WE COULD TALK ON forever and never convince you like one ride in this marvelous Maxwell will. Take that ride and then agree that we can't say too much about this great automobile.

# Maxwell Motor Co., (Inc.)

Detroit, Michigan  
Dealers and Service Everywhere

Maxwell 25-4

\$750



Address  
Dept. M.A.  
for  
Literature  
Describing  
This  
Wonderful  
Car

A full five-passenger car of ample wheelbase and constructed in what might be called conventional design. Three-speed selective transmission, uniform size tires, standard type magneto. Motor cast "en bloc" with detachable heads. Water cooled thermo siphon system. Center control, left-hand drive, Prest-O-Lites, tire holder, windshield and top, and Jiffy storm curtains, etc.



**THE  
*Detroit*  
ELECTRIC**

## **Make Your Line Complete By Adding an Electric**

The electric pleasure car has forged ahead fast—so rapidly, in fact, that dealers today are face to face with this situation:

Scarcely any dealer's line is really complete without an electric.

Nor is the range of activity of the electric any longer limited to a small area.

The Detroit Electric is covering a wide radius in Chicago, which is greater in size than any other American city. It easily climbs the steepest hills in Kansas City, Pittsburgh and Seattle. New England snowfalls are no barrier to it in Boston. Its flexibility tells in New York, where vehicles travel at a brisk pace.

The Detroit Electric leads all others. Its sales are double the sale of any other electric. In Detroit, the automobile center, more Detroit Electric cars have been sold in the past five years than of all other electrics combined.

Detroit Electric supremacy compels attention, calls to the dealer's mind that it pays to handle the leading electric. The profits of Detroit Electric dealers are twice as great as the profits of dealers of any other electric, because Detroit Electric dealers sell twice as many cars as the dealers for any other electric.

The Detroit Electric leads in sales because it leads in quality, in new features, in refinements, in advanced appointments. Get in touch with us. Write for the new Detroit Electric catalog, and for our opportunity to dealers.

**Anderson Electric Car Company, Detroit, Mich.**

*Builders of the Detroit Electric*  
**LARGEST MANUFACTURERS OF ELECTRIC PLEASURE VEHICLES**



**"Olympic Forty" \$1385**

115-inch wheel base and wide seats; long stroke motor, full 40 horse power; beauty of design second to none; full elliptic springs front and rear; smooth quiet running closely approaching silence; electric cranking and lighting, and complete general equipment. Only \$1385.

**"Majestic" \$1885**

Long stroke, four cylinder motor, 45 H. P.; electric cranking. Wheel base 124 inches. Tires 36 x 4. Full elliptic spring suspension front and rear. Full floating rear axle. Extra roomy body. Wide seats, wide doors, 10-inch cushions. Completely equipped.

**"Sultanic" \$2150**

Long stroke, six cylinder motor, 55 H. P.; electric cranking. Wheel base, seven passenger, 138 inches; five passenger 132 inches. Tires 36x 4½. Full elliptic spring suspension front and rear. Full floating rear axle, ball bearing throughout. Completely equipped. Seven passenger model, \$2300.

**"No Hill Too Steep, No Sand Too Deep"**

## Proven Performance Sell That to Your Prospects

BUYERS used to decide upon a certain make of car from specifications alone. Now they demand something more before putting their name on the order.

With the Jackson line you have everything they can ask for—and more—for the money. There is designing ability and workmanship that has grown expert in twelve years' experience. A record for dependability that has been built up by Jackson cars during that same twelve years in the hands of thousands of owners. A reputation for permanence in the organization—a business which was started during the infancy of the automobile, has grown steadily for twelve years and is growing still bigger and more secure every day.

These are the things that give the buyer a car backed by *proven performance* and guarantee the dealer a line that is easy-selling and profit-making.

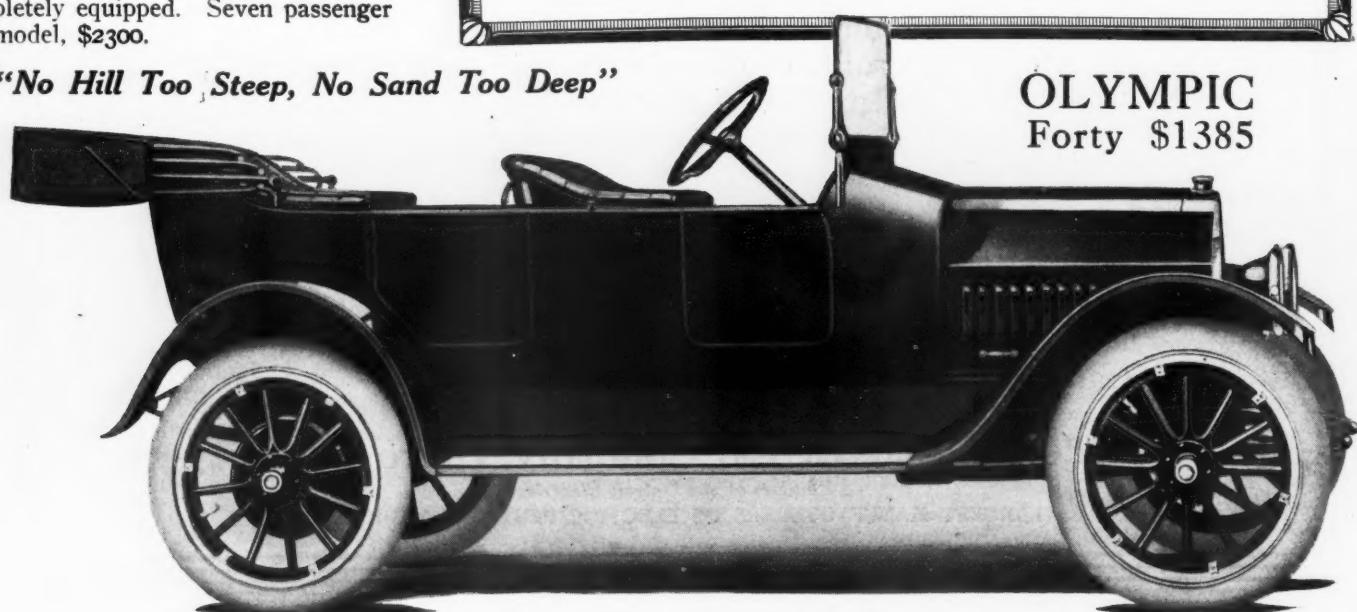
There is service in every car that bears the Jackson nameplate. There is tremendous strength throughout—from the hickory wheels, the sturdy ball bearing axles, the deep steel frame, up to the bows that rigidly support the top.

There is a world of power in Jackson motors. The power that makes "No Hill Too Steep, No Sand Too Deep." They are smooth and silent in operation, too. There is comfort in Jackson cars, in their full elliptic springs, long wheel base, big wheels, thick upholstery and wide, high-backed seats. Their bodies are both roomy and beautiful.

These are all things the wise buyer demands. Remember that, Mr. Dealer. Study the specifications of the three models—then note their prices. They have no real competition on *proven performance* plus dollar and cents value in specifications.

A few spots of territory where we want good representation. Write for information and catalog.

**JACKSON AUTOMOBILE COMPANY**  
**1207 East Main Street**      **Jackson, Michigan**



*When Writing to Advertisers, Please Mention Motor Age.*



## Two Radiator Shells Per Minute

THE above machine is another one of the numerous Overland cost reducers. This machine turns out 120 whole outside radiator shells per hour.

Small manufacturers, who must by necessity use small equipment, can only turn out two per hour.

We make two per minute.

There you have the difference—which is one of the many reasons why the Overland costs less than any other similar car in the world.

**The Willys-Overland Company, Toledo, Ohio**

*Manufacturers of the famous Overland Delivery Wagons, Garford and Willys-Utility Trucks. Full information on request.*

**\$950**

*Completely Equipped  
f. o. b. Toledo.*

Electric head, side, 35 Horsepower motor  
tail and dash lights 33 x 4 Q. D. tires  
Storage battery 114-inch wheelbase

Stewart speedometer  
Mohair top, curtains  
and boot

Clear-vision  
windshield  
Electric horn

**\$1075**

*With electric starter and  
generator f. o. b. Toledo*

*When Writing to Advertisers, Please Mention Motor Age.*

**Stop watching for bumps  
and uneven places—  
ride on**

# VELVET SHOCK ABSORBERS

**Speed without jolt  
Touring without fatigue**

Velvet Shock Absorbers on your car will be a delightful surprise to you.

They will save 35% wear and tear on your car and tires—give a soft, comfortable motion to your car without side sway—no more bills for broken springs—save their cost in 90 days—are elegant, durable, small.

### 10 Days Free Trial

We guarantee Velvets to give satisfaction or money back—10 days free trial. Mechanical Engineers endorse Velvets—physicians recommend them.

Write today for Descriptive Folder—at least investigate.

**DEALERS**—Make more money on Accessories—write for liberal terms and exclusive agency.

**The John W. Blackledge Mfg.  
Company**

Dept. B

CHICAGO, ILL.



**No loss of Accuracy through  
Changes in Temperature**



**CENTRIFUGAL** force is an absolutely reliable means of accurately measuring car speed. It is constant, unvarying, in winter and summer, in high altitudes and low. It is this force that controls every movement of the

## Jones Speedometer Centrifugal Principle

### Geared to the Truth

From hub to dial the Jones Centrifugal Speedometer represents one continuous, unbroken, metal-to-metal contact, through which the exact speed of the road wheel is directly passed up to the recording hand.

It has no delicate hair springs or compensating mechanism. Its parts are few, simple and proof against the destructive effect of vibration. The indicating hand moves steadily over the clock-face dial, which is easy to read from any part of the car. Many other noteworthy features, such as the instantaneous trip reset, give increased convenience.

### Backed by a Service and Guarantee of Known Integrity

The H. W. Johns-Manville Company now control the selling and marketing policies of the Jones Centrifugal Speedometer. Johns-Manville Service Branches, in practically every principal city of the United States and Canada, are equipped to handle with expert efficiency all matters pertaining to adjustments, repairs and replacements. The J-M Guarantee Tag attached to each instrument is your assurance of satisfaction. When you specify Jones equipment you are assured of a principle giving absolute reliability and a Service that is established rather than promised. Write nearest Branch for booklet.

### H. W. JOHNS-MANVILLE CO.

*Brake Lining, Spark Plugs, Electric Lamps, Speedometers, Horns, Fire Extinguishers, Carburetors, Dry Batteries, Vaporizers, Auto Locks, Fuses, Tapes, Packings, Etc.*

Akron	Indianapolis	Louisville	Minneapolis
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Branches in 49 Cities assure  
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## Stop the Holes and Save the Tires

A little hole neglected soon becomes a big Blow-Out and in many cases blow-outs result in very serious accidents.

The safest way is to keep your tires in good condition with a Shaler Vulcanizer and prevent punctures, blow-outs and accidents.

# SHALER Vulcanizers

save repair bills, treble your mileage and free you from annoyance and worry of tire trouble. Get a Shaler Vulcanizer and keep your tires in good condition—all the time. It pays to do so.

### More Shaler Vulcanizers Are Sold Than of All Other Makes Combined

They are used by the best garages and repair Shops everywhere. We are the largest manufacturers of vulcanizers in the world—and make *the only complete line of Vulcanizers*—which includes every type—Electric—Gasoline—Alcohol and Steam, for every requirement. Shaler Safety Vul-Kit \$3.50—Shaler Model D for Motorists' use \$12.50—Complete Shaler Vulcanizing Plant (for Garages and Repair Shops) \$60.00.

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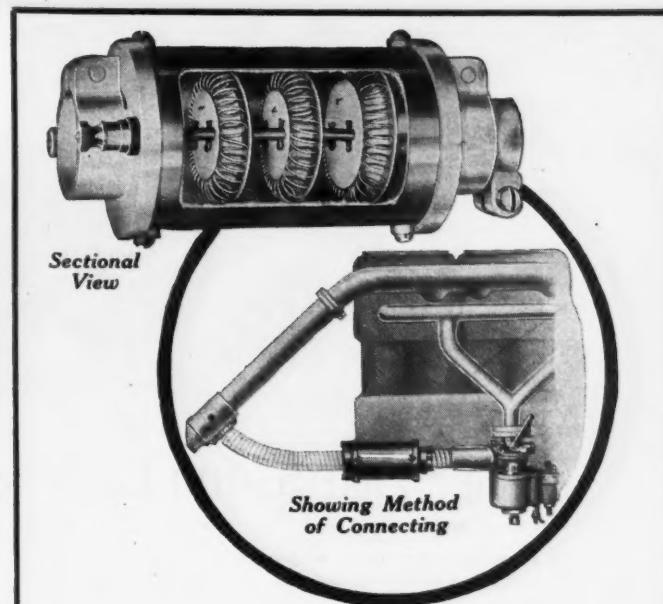
### Write for Our FREE BOOK "Care and Repair of Tires"

which is brimful of practical suggestions and information about automobile tires. It tells what to do for every kind of tire trouble and how to vulcanize and repair your own tires at home.

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## Deals Successfully with the Cause of Winter Starting Troubles

Heating the air supply previous to drawing it past the gasoline jet of the carburetor insures thorough vaporization, whatever the surrounding temperature, and the engine starts at once. This is most economically effected by the

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*"Starts motor without priming"*

Consists of a series of resistance coils which are installed in the carburetor air inlet. Current from a 6-volt storage battery quickly heats them to such a degree that the air passing in becomes sufficiently hot to form a perfect mixture and the engine starts on two or three quarter turns.

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Operated on four dry cells or a 6 volt storage battery consuming about 4 amperes. These plugs effect results similar to the above on small engines where they are installed in the inlet manifold instead of in the carburetor inlet. Price, complete, switch, two plugs and resistance coil, \$3.50.

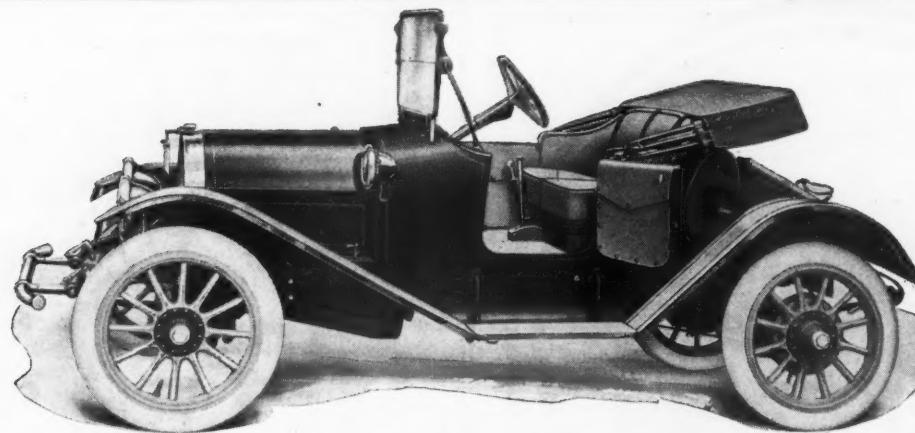
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Retail Price \$15.*

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**Stock sizes for immediate shipment  
to fit the following cars**

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Campbell Water-Proof Seat Covers make new cars look better, make old cars look new. They protect upholstery and add a touch of refinement that no other accessory can give your car. Easy

to put on. Easily taken off and cleaned. Water-proof and dust-proof.

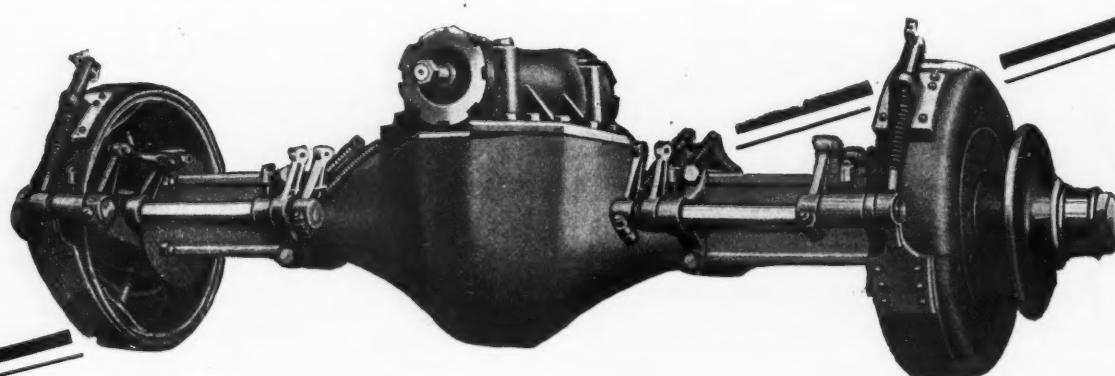
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Get our sales proposition. Big money,

"**CAMPBELL**"  
ACCESSORIES

Write for catalog giving full line of seat covers, auto straps, knuckle or crank boots, magneto covers, tool rolls. Also a special line of Ford accessories.

quick money selling Campbell Seat Covers and Accessories. You cannot afford to miss this chance in a virgin accessory field.

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## Do You Know What Selden Worm Drive for 1914 Means?

**IT MEANS A MORE POWERFUL TRUCK** because there is only a single reduction—little power is lost in transmitting the power from the motor to the rear axles.

**IT MEANS A SILENT TRUCK**—fewer parts are required for its construction, and these are enclosed and work in oil.

**IT MEANS AN UP-TO-DATE TRUCK**—To-day the demand is for the thoroughly proved worm drive.

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And finally it means better service to the owner—and increased sales for the manufacturer.

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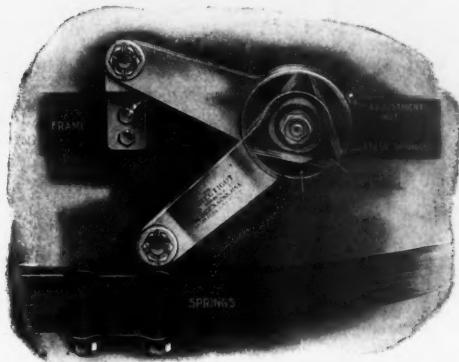
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**CONNECTICUT®**

## Shock Absorbers Take the Bumps Out of All Roads



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Built on the only true shock-absorbing principles—the Connecticut Shock Absorber adjusts itself automatically to all road conditions and the varying weight of the load. They reduce tire bills and prevent spring breakage because they actually absorb the jolts. They mean motor comfort.

### Special for Ford Cars

Real shock absorbers, embodying all the features of the large "Connecticut" types, are furnished for Ford cars at an extremely reasonable price.

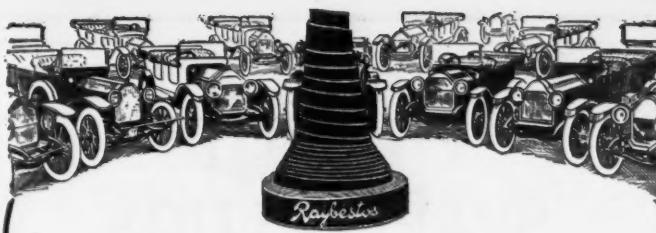
This special absorber is not a cheap device but possesses all the features of our absorbers installed on Pierce-Arrow, Haynes, Knox, Cunningham, Kissel Cars and others.

Make your Ford "a parlor car." Equip with "Connecticut" absorbers.

**Price \$22.50 Per Set**

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If your car is one of the above or practically any other of the well-known makes—then the brakes are lined with Raybestos Brake Lining. At least they ought to be, because the specifications on over 75% of the different makes of both pleasure and commercial cars call for

**TRADE MARK**  
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Good company to be in—and good company to stay in—make the safety of the brakes of your car double sure by seeing that they are lined with Raybestos. It will always grip and hold the brakes in an emergency because it is made of long instead of short fibre asbestos, woven and treated in a way that gives it greatest gripping power. It won't fray, ravel, peel or disintegrate in use. Is not affected by the action of oil or water.

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## SPARK PLUGS

give satisfactory service continually and prove dependable regardless of temperature and climatic conditions.

**They are the Best Plugs Made.**

*Send to our nearest house for literature on*

- Our Maximum Duty Plugs**
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*Manufacturers of the 7,000,000 "Bell" Telephones*

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Starts — Lights — Ignites

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Six Volt System—Does-It-All

REMY Apparatus, designed by the recognized authority, Mr. O. F. Conklin, is STANDARD and gives universal satisfaction.

#### Ask Any Driver of a Remy Equipped Car

The responsibility of the complete electrical apparatus is assumed by one reliable, experienced company with a country-wide system of Service Stations to render quick and efficient service.

The only concern building STARTING, LIGHTING and IGNITION devices in any combination desired.

Write for our magneto exchange proposition.

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Office and Works

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"Whenever I see a man tugging and straining with a hand pump, I step up and offer him the use of my Brown. The result is always the same. He wants to know where I got it and says he's going to get one right away. You ought to pay me a commission."

That's what one enthusiastic Brown owner writes. His experience can be multiplied by 50,000, for there are 100,000 Brown enthusiasts in the country.

Join This Satisfied Army.

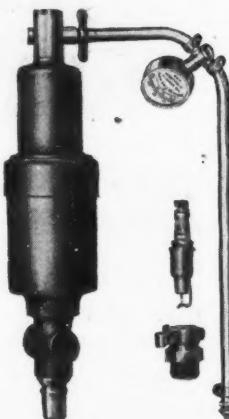
Remember the Brown Impulse Tire Pump is the only tire pump that includes spark plug, recording gauge and self opening valve connection as part of the regular equipment. The only one made of gray iron like your motor. The only one that can be attached and detached without a wrench.

Price, complete with plug for .....	\$15.00
Extra plugs .....	1.00
Previous models made over to fit the new connection .....	1.50

Your Dealer knows the Brown.  
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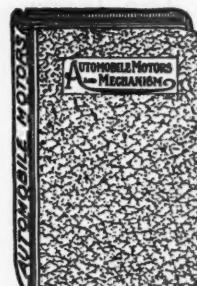
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## Automobile Motors and Mechanism

By THOMAS H. RUSSELL, M. E., LL. B., Author of "Automobile Driving Self-Taught," "Ignition, Timing and Valve Setting," "Motor Boats: Construction and Operation," etc.

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#### CONTENTS.

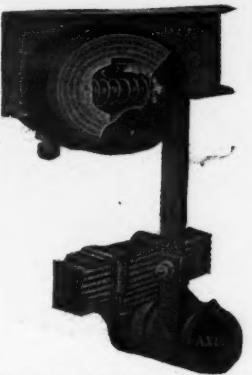
The Internal Combustion Engine—Principles and construction—Production of the fuel mixture—Function of the carburetor—The cycle of operations—Cylinders, piston and rings—Shafts and bearings—Ignition apparatus—Single and multi-cylinder engines—The two cycle engine—Valves and their functions—Silencing the exhaust—Engine hints and tips—A typical modern motor—Detailed description of construction—Governing and Governors—The centrifugal governor—Throttle valves—Governing and control—The hit-or-miss governor—Carburetors—The float-feed principle—The float chamber and jet—Various types of modern construction—Quality of mixture—Flooding the carburetor—Carburetor troubles and adjustments, etc.—Transmission Mechanism—The Clutch—Various forms in use—Positive and friction clutches—Plate or disk clutches—The combined disk and cone type—Expanding clutches—Clutch troubles, etc.—Gear or Gearing—Belt and chain gearing—Friction gear—Spur or tooth gearing—Spiral, helical, worm and bevel gearing—Epicyclic gear—Ininitely variable gear—Differential or Balance Gear—Its functions—Shafts and Their Functions—The crankshaft, half-speed shaft, countershaft, etc.—Lubrication and Lubricators—Pumps and Their Purposes—Motor Misfiring, Causes and Remedies—Noises in the Motor, Causes and Remedies—Motor Overheating, Causes and Remedies—Electric Motors—Principles and operation—Steam Cars—The engine, generator, reverse gear, etc.

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Standard Factory Equipment  
on the easiest-riding cars:  
White, Stearns, Peerless, Oldsmobile and Lozier. Partial or Special Equipment on over twenty other leaders.

Ask the Engineering Department of the maker of your car for their opinion of Gabriel Snubbers. We are willing to leave it to their judgment, as they have tested Snubbers and know their merits.

\$15, \$20, \$25, per set of four.  
Half these prices per pair.

# GABRIEL SNUBBERS

— Think of the repair bills you now have to pay because of jolts and jars to mechanism, lighting and starting equipment!

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## Then Think

of the increased comfort and the thousands of miles more service a car will give when protected by Snubbers!

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We also manufacture the famous GABRIEL Musical Horns and Windshield Cleaners

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The persistent, constant and strenuous stresses of race track speed prove the superiority of New Departure Ball Bearings.

Thirty-nine winnings, twenty-six seconds, and eleven thirds, over a total of twenty-eight other motor cars, including foreign racing models, is the story of the New Departure equipped Mason Car the past season.

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and are in every way the most accurate, durable, reliable and altogether satisfactory for testing batteries and electrical circuits

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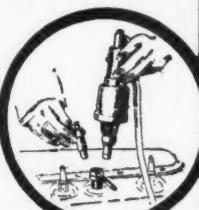
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Adaptable to all size cars. Instantly attached by substituting for any spark plug. Mayo Quick Detachable Spark Plug may be used if desired. Pumps pure, fresh air only. Inflates largest tire in from 3 to 4 minutes. Built with metal rings like a motor and will last as long. Weight 2½ lbs. An occasional drop of oil the only

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"It's an absolute impossibility to 'open up' a plant and immediately deliver efficient gear assemblies.

"It takes time and experience—especially experience,—to enable a concern to ship really dependable parts.

"This is an undisputable fact, no matter what the business happens to be.

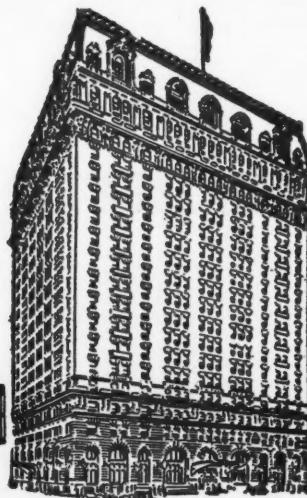
"We are surely capable, in lieu of these facts, as for thirteen years we have been manufacturing automobile gear parts for the most successful and best known motor car manufacturers in the country.

"And listen, what is more, we've been pleasing them in every particular.

"Is there any better proof of a product's merit than one hundred per cent of satisfied customers?

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Motor Cars  
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**Electric Engine Starters**  
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**(for Motor Cars)**

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The dealers who have been quick to see the possibilities of this horn are already reaping a substantial profit. Our \$50.00 dealer proposition is a wonder.

**STANDARD MOTOR PARTS MFG. COMPANY**  
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You were glad to see Uncle Sam build the Panama Canal! Ever expect to use it personally?

**Ever expect to use it personally?  
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But YOU CONTRIBUTED to it!**

You gave up a little over \$5 for it on your own account, and a similar amount for your wife and each of your children and for

You may not know it but that's the proportion of your Government tax that went to Panama.

The Lincoln Highway, running from

You don't HAVE to contribute as you did to the Panama Canal.

You don't HAVE to contribute as you did to the Panama Canal, because the Government is not going to tax you for it.

We want you to join in this work of your own free will. We want you to contribute an even \$5 (or more) for yourself—notthing for the wife or children.

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# The Lincoln Highway Association Detroit, Michigan

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Changed in less than ONE MINUTE'S TIME from a stylish Touring Car to a Comfortable Closed Car, is the Lewkowicz Convertible Automobile Body manufactured by the Convertible Automobile Body Corporation.

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Screw Stock, Flats, Squares, Hexagons and Special Shapes

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Lead the world in quantity of production. Twelve mammoth factory buildings required to supply the demand.

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**HYATT ROLLER BEARING CO.**  
Detroit, Michigan

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If your car is water cooled, the radiator is coated inside with rust and "scale." The older the car—the heavier the coating. You get less power daily. You pay more for oil, fuel and repairs. Your radiator can't do its work.

## RADIATOL

*Makes a radiator be good*

RADIATOL removes and prevents all "scale" and rust caused by lime and acids. It cleans out a radiator and keeps it clean as new—always. It's safe. A sure leak prevention.

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Guaranteed to do as we say or money refunded on your say so

THE WILLS CHEMICAL CO.

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Wheeling, W. Va.

## \$60.00 A Year Saved In Tires

That's only one of the savings now offered motorists by the already well known



## TAYLOR "NOIL" TIRE PUMP

An engine driven tire pump that adds to life of tires by keeping rubber-rotting oil and oily vapor out of the tube. No oil to get in. Also saves an endless amount of back-breaking pumping by HAND! Engine does it all. That's the other advantage. The only pump made with diaphragm and plunger.

The one pump that CAN be easily applied! Special bracket for your own car furnished together with hose, tire gauge, etc.

Write Today for Circular

In writing, please give make, model and year of your car.

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Could see us build the Cable-Structur Tire—see how slowly and carefully our tire builders work—see what quality we put into

Cable-Structur—see the letters we have from satisfied dealers and users, you wouldn't delay one minute in writing us for the exclusive agency in your city.

Come to our factory and see all these things with your own eyes. The evidence for Cable-Structur service and satisfaction is unanimous. Write today for our proposition.

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# The AERMORE

Exhaust Horn

## Utilizes a Car's Waste Product

The AERMORE Horn attaches to the exhaust pipe. Opening the exhaust by means of a foot-pedal brings the horn into action.

The exhaust gases ordinarily wasted are thus made use of—at considerable saving to you. Because the AERMORE is dependent upon neither batteries, wires, "buzzers" or ratchets, it is absolutely certain in operation, as well as without one penny of upkeep expense.

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The AERMORE is self-cleaning, clog-proof. It is a chime horn, musical, yet with a voice of authority. It never insults. Has two tones, one low but clear, the other high and good for a mile.

Made of brass tubes, heavily nickel-plated. No complicated parts. Very easy to install. Comes with all fittings ready to attach.

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motorcycle.	\$5.50

Write for literature.

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"Always There"

## Ignition Service

### It Doesn't Matter

what brand of ignition your automobile is equipped with—SPLITDORF SERVICE is AT YOUR COMMAND. The whole SPLITDORF organization is YOUR FRIEND—we want EVERY user of a hydro-carbon engine to be OUR FRIEND. We'll leave no stone unturned to bind the friendship with TRUE SERVICE.

Call upon our nearest Branch Manager if you have ignition troubles—he'll advise and help you without delay. He's there for the purpose—you can depend upon him to treat you right.

### Splitdorf Electrical Company

ATLANTA, 10-12 E. Harris St.  
BOSTON, 180-182 Mass. Ave.  
CHICAGO, 64-72 E. 14th St.  
DETROIT, 972 Woodward Ave.  
KANSAS CITY, 1828 Grand Ave.  
LOS ANGELES, 1226 S. Olive St.  
FACTORY: NEWARK, N. J.

NEWARK, 290 Halsey St.  
NEW YORK, 18-20 West 68rd St.  
PHILADELPHIA, 210-212 N. 18th St.  
SAN FRANCISCO, 1028 Geary St.  
SEATTLE, 1628 Broadway.  
LONDON, BUENOS AIRES.



You, too, will enjoy the luxury of a steady-running, never-missing motor the instant you install the

## J-M (MEZ-GER) Soot-Proof Spark Plug

This plug never short-circuits. It is made with a double chamber formed by a porcelain petticoat around the center electrode. This petticoat extends to the end of the plug and is always so intensely hot when sparking, that carbon is burned up the instant it settles.

Rapid changes of temperature will not crack the porcelain.

No soot—no short-circuiting—no broken porcelain—therefore no interruptions in service.

*Guarantee!* If any plug does not give satisfactory service we will supply a new one or refund purchase price.

Price, \$1.00. Shipped direct from our nearest Branch if not sold by your dealer. Write for interesting Booklet.

### H. W. JOHNS-MANVILLE CO.

<b>JOHNS-MANVILLE SERVICE</b>	Albany	Cleveland	Louisville	Philadelphia
<b>LOVERS THE CONTINENT</b>	Baltimore	Dallas	Milwaukee	Pittsburgh
	Boston	Detroit	Minneapolis	San Francisco
	Buffalo	Indianapolis	New Orleans	Seattle
	Chicago	Kansas City	New York	St. Louis
	Cincinnati	Los Angeles	Omaha	Syracuse 2219
THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED,	Montreal	Winnipeg	Vancouver	

**AUTO-SUGGESTION**  
**CLEAN YOUR CYLINDERS OFTEN**

Use the one sure and practical carbon remover.  
Loosens the carbon and it is blown out through the exhaust.

**CARBONOX**  
"CHEMICALLY CORRECT"  
COSTS BUT 5 CTS A CYLINDER

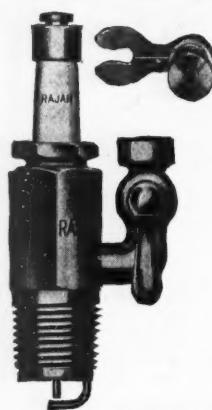
By the makers of SE-MENT-OL

THE NORTHWESTERN CHEMICAL COMPANY

**PRESSED Steel Frames for  
Pleasure Cars and Trucks**

Folded Type Axle Housings  
Heavy Stampings—Forgings

**A. O. Smith Co.**  
Milwaukee



**RAJAH  
PRIMING PLUG**

Priming cup soldered in firmly to prevent leaking.  
Material and workmanship of the highest grade—fully up to the standard set by us for over ten years.  
Terminals as shown furnished with every Plug.

**\$1.50**

RAJAH AUTO SUPPLY COMPANY  
Bloomfield, N. J.  
John Milen & Son, Limited  
Montreal, Toronto, Vancouver, Winnipeg

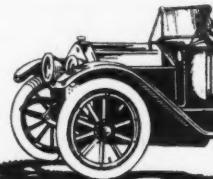
**Packard  
CABLE RESISTS HEAT**

Heat takes the "life" out of rubber—cracks open—oil, grease and water gets in—no end of trouble results.

Packard cable is not affected by heat. The braids are impregnated with an enamel which protects the rubber from injury by heat.

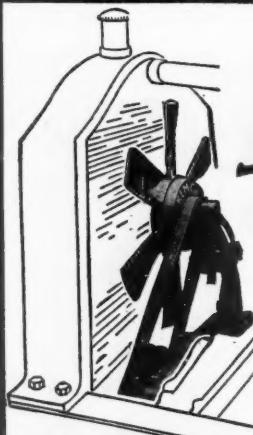
Think this over and send for our new folder showing 16 samples, exact size and natural colors.

**PACKARD ELECTRIC CO.  
Dept. C. WARREN, OHIO**



(83)

**SALISBURY  
AXLES WHEELS  
TRANSMISSIONS**



**THE  
*Kemco*  
FAN TYPE  
GENERATOR**

The only generator which can be attached to cars now in service without excessive expense for installing.

You can put it on your car. First cost—the only cost.

(17)

The Kemco Electric Mfg. Co.  
CLEVELAND, OHIO

**AUTOMOBILE  
SPRINGS**

**THE PERFECTION SPRING CO.**  
Cleveland  
Ohio

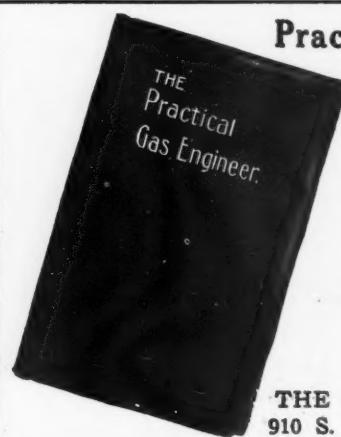
**Cut Gears of Quality  
Complete Differentials**

**NEW PROCESS  
GEAR CORPORATION**  
SYRACUSE, N.Y.

**Practical Gas Engineer**

By  
E. W. LONGNECKER

Twelve years' constant experience with Hydro-Carbon Engines. How to start, how to operate, and how to care for all classes of explosive motors or engines using gas, gasoline or similar fuels. A full and exhaustive chapter on electric and other systems of igniting. Every line tells something. Every page full of interest. A book of 172 pages, neatly bound in cloth. Sent postpaid on receipt of price, \$1.00.



**THE CLASS JOURNAL CO.**  
910 S. Michigan Ave., Chicago

The Benham Steering Gear  
for CYCLECARS

Adapted to Overslung or  
Underslung Cyclecars

Adapted to  
Either Right  
or Left Steer,  
also Center.

Send your specifica-  
tions and requirements  
for quotations. We can  
make immediate de-  
liveries.

Benham Mfg. Co.  
1882 Mt. Elliott Ave.  
DETROIT, MICH.

**SEND \$10.00**  
for the Empire Gasoline Economizer  
**We'll Send It Back**

The logo for Detroit Springs features the word "RESILIENT" at the top in a bold, sans-serif font. Below it is a stylized, decorative letter "D" that forms the beginning of the word "Detroit". The letters "etroit" are stacked vertically, with "s" on top, and "prings" written below them in a smaller, slanted font. A horizontal line with jagged ends runs across the bottom of the "D" and "r" letters. Below this line, the words "SILENT" and "SELF-LUBRICATING" are written in a bold, sans-serif font, separated by a thin vertical line.

The two year guarantee on Detroit Springs is justified by the forty-eight careful processes, the three decisive tests, the Self-Lubricating Device—patents pending. Our booklet tells why motorists are insisting upon having their cars equipped with Detroit Springs. Write for it.

Detroit Steel Products Co., 2260 E. Grand Blvd., Detroit, Mich.

The Cartercar logo is at the top left, featuring the brand name in a stylized, flowing script font inside a decorative oval. A thick black arrow points from the right side of the oval towards the word "Gearless" which is written in large, bold, sans-serif capital letters. The background of the entire advertisement is white.

# The Pilot "THE CAR AHEAD"

*When Writing to Advertisers, Please Mention Motor Age.*

## FORD SPECIAL C-Well Rear Sight Auto Mirror

Fits Any Ford Wind Shield  
Every Ford Owner Should Have One

\$2.00  
Black Enamel  
\$3.00  
All Nickel

"Safety First"

The Standard Spinning & Stamping Co., Toledo, O.

Eliminates all chance of accidents from rear end collisions, backing down embankments, etc. Pays for itself every day in the year. Made in 6" circle, finished in black enamel or nickel. The all nickel is built specially for Ford Cars. Money back if not satisfied. Agents wanted.



## Springs of Cross-Rolled Steel Cut Upkeep

In this new process, the steel is worked both longitudinally and transversely. So we get superior strength and toughness. This process is used exclusively in our Chrome-Vanadium Brand of Springs.

Find out more about them. It will make a tremendous difference in the riding qualities of your car. Let us send you full particulars.

*Best Grade—Chrome-Vanadium  
Next Best—Special Analysis*

The Cleveland-Canton Spring Co., Canton, Ohio, U.S.A.



### The Atwater Kent Ignition System

For every kind and make of motor. A system ideal in efficiency, simplicity, and reliability.

Write today for booklet A.

ATWATER KENT MFG. WORKS

4934 Stenton Ave., Philadelphia.



High and low tension magnetos, make-and-break coils, dash coils, box coils, motorcycle coils, switches, spark plugs and other ignition specialties. Guaranteed satisfaction.

WRITE FOR CATALOG

KOKOMO ELECTRIC COMPANY, Kokomo, Ind.

## THE CROWE MASTER VIBRATOR A BOON TO FORD OWNERS

Ends all vibrator troubles permanently. Produces a quick, hot spark, always uniform—no missing or late sparks.

Takes the "jump" and "jerk" out of your machine; increases its power; economizes fuel; makes your engine start easier, pull steadier, run smoother, develop more power.

You can go slower on high gear without danger of killing your engine.

The Crowe is the simplest vibrator made: only 2½ inches in diameter—neat in appearance; easily installed—no need of an unsightly box on your dash.

This vibrator is so different and so much better in its construction and in the work it will do than any other vibrator, that Ford owners will be surprised when they investigate.

**PRICE ONLY \$10.50.** Sold by garages or accessory dealers everywhere, or sent direct on receipt of price—under our positive guarantee of perfect satisfaction or all money refunded—after 30 days' trial. Dealers will find the Crowe a good seller in a big field, at a good profit. All Crowe users are satisfied and enthusiastic customers. See your dealer or write us direct.

LISLE MANUFACTURING CO 100 Main St., Clarinda, Iowa



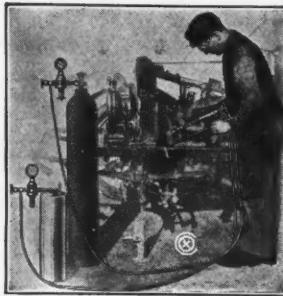
## Cox Combination Welding & Decarbonizer Outfit

Save time, money and make extra profit doing your own welding. Outfit complete and simple; repairs worn and broken parts good as new. Welds iron, steel, brass, bronze and aluminum. Safe and sure. Quick repair work. Includes oxygen carbon remover feature. Double work, double profits. Pays for itself in short time. Complete instructions furnished.

Write for Catalog—NOW

Cox Brass Mig. Co., Albany, N.Y.

 1777 Broadway ..... NEW YORK CITY  
3445 Michigan Ave. .... CHICAGO, ILL.  
870 Woodward Ave. .... DETROIT, MICH.  
1216 Van Ness Ave. .... SAN FRANCISCO, CAL.



## KISSELKAR TRUCKS

### Complete Line of Commercial Vehicles

All type bodies—special bodies designed. Unexcelled for service, efficiency and economy. KisselKar Trucks have great reserve power. Low fuel cost; sizes to give more economical service under all conditions.

#### 1500 lbs. 1, 1½, 2½, 3½ and 6 Tons

KisselKar Service Buildings at principal points throughout the U. S. are equipped to give an unusual service to owners of KisselKar Trucks. Let us analyze your haulage problem and show you how to make a big saving.

Write for Catalog—Over 200 Styles

Kissel Motor Car Co., 121 Kissel Ave., Hartford, Wis.

## Your Car Can Tell by its smooth, silent running, that

TRADE MARK REGISTERED IN  
**NON-FLUID OIL**  
UNITED STATES PATENT OFFICE

is cushioning each bearing and gear with a film of lubricant that insulates the mechanism from all shocks and jars, and protects it from wear and tear.  
NON-FLUID OIL adds to the pleasure of motoring and saves many a dollar on repair bills.  
NON-FLUID OIL is packed only in orange-colored cans bearing above trade-mark.

Send a postal for interesting booklet.

"Protect Your Motor Car Investment"

New York & New Jersey Lubricant Company  
165 Broadway, New York 1430 Michigan Ave., Chicago

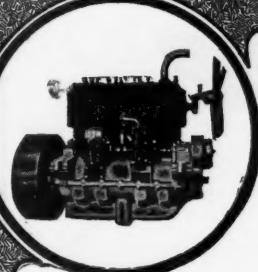


**PREMIER**  
AMERICA'S  
GREATEST TOURING CAR

PREMIER MOTOR MFG. CO.  
INDIANAPOLIS, INDIANA

**HERZ PLUG**  
"BOUGIE MERCEDES"

**BLUE STONE & STEEL**  
Guaranteed One Year  
Your Dealer or HERZ & CO. New York



**Continental Motors**  
4 and 6 Cylinder Types

Not made to meet a price, nor to shatter records of quantity, but to fulfill a service ideal—  
to be a true foundation for a worthy motor vehicle.

**Continental Motor Mfg. Co.**  
Detroit, Mich.  
Factory Representative, K. F. Peterson, 122 S. Mich. Ave., Chicago



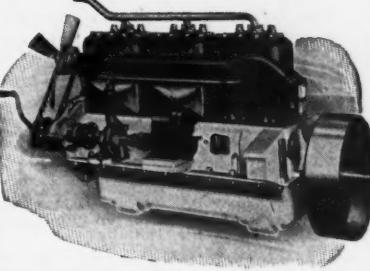
**THE RUTENBER MOTOR**

MANUFACTURED SINCE 1901 FOR HIGH GRADE AUTOMOBILES AND TRUCKS

3½ x 5¼ four and six cyl.  
4½ x 5½ four and six cyl.  
Standard or Unit and  
4 x 4, 4½ x 5 and 4¾ x 5  
Standard Types. All L Head 4 Cycle.

Manufacturers are invited to investigate our service and our facilities. Literature on request.

**The Rutenber Motor Company**  
Marion, Indiana



**Firestone**  
Accessories

A Trade That Repeats

They give that help at a pinch so vital to motoring pleasures. They always "work."

Hook-On Boots; Lace-On Boots; Blow-Out Patches; Cementless Tube Patches; "Cure-Cut"; Cement; Tire Tape; Tire Talc; Pure Gum Molded Tube Patches; Red Wrapped Tube Patches; Repair Materials in Packages; Repair Kits, etc. Send for catalog.

**THE FIRESTONE TIRE & RUBBER CO.**  
Akron, Ohio—All Large Cities

**STAPLEY**  
TIRE PUMP

Made by Bridgeport Brass Co.

**Increases the Life of Tires**

The STAPLEY makes it easy to keep tires properly inflated. It is an efficient Compound pump of the finest materials and workmanship; it is always ready and always works.

Price without Gauge	\$4.00	With Gauge	\$6.00
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**THE BRIDGEPORT BRASS COMPANY**  
P. O. Station A      Bridgeport, Conn.





Manufacturers of 1914 Models Don't omit a SPARKS-WITHINGTON Fan from your 1914 specifications. Our One-Piece blade, ball-bearing, radiator fan assemblies cool the motors of more high-class cars than any other fan on the market. There's a reason. SPARKS-WITHINGTON Fans deliver the greatest volume of air with the least H. P. consumption of any fan obtainable. Furthermore, their one-piece construction is positive insurance against blades which loosen, become detached and fly off. Undoubtedly one of our ten standard models is just what you have been looking for. Catalogue and detailed blue-prints on request. Get in touch with us.

**The Sparks-Withington Co.**  
JACKSON MICHIGAN - WALKERVILLE, CAN.

**Herreshoff** Electric Self-Cranking Electrically Lighted Four Forward Speeds

The Herreshoff six was the first light six built and is today conceded the best example of skillful design in combining strength with reduced weight.

"Six-Forty" Touring Car and Roadster \$1600 — 7 Passenger \$1650  
Model 4-30 Touring Car - \$1350  
Model 4-30 Coupe - - \$1650  
Model 4-30 Roadster - - \$1250

Live-Wire Dealers Write for Unallotted Territory.

**HERRESHOFF MOTOR CO.,** Detroit, Mich., U.S.A.

**The Thoroughbred Car**



## The Searchlight Gas Co.

1016 Karpen Building

CHICAGO, ILLINOIS

Stronger than ever, legally, financially and in the esteem of the trade. Watch us grow.

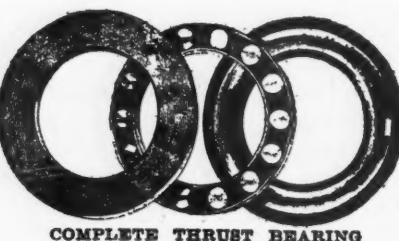
BRANCHES AND REFILLING STATIONS:

Warren, Ohio	San Francisco, Calif.	Los Angeles, Calif.
Chicago, Ill.	Buffalo, N. Y.	New York City
Detroit, Mich.	Atlanta, Ga.	Syracuse, N. Y.
Camden, N. J.	Dallas, Tex.	Minneapolis, Minn.
Philadelphia, Pa.	San Antonio, Tex.	Toronto, Canada
Kansas City, Mo.	Boston, Mass.	Indianapolis, Ind.

Why should the auto business be different from any other business? To my mind it is not, and the sooner it gets down to a horse sense basis the healthier it will be. The day when it was a "game" is gone. The red fire and hurrah period is past. And the companies which stay in are the ones which are going to adopt a hard-headed, close-margined, business-like policy.

*E. C. Ainsworth*

President of The Lexington-Howard Co.  
Manufacturers of Lexington "Four," \$1335, and the Howard "Six,"  
\$2375, Connersville, Indiana.



The Star Ball Retainer Co.  
Lancaster, Pa., U. S. A.

Manufacturers of Radial Ball Retainers, Thrust  
Ball Retainers, Complete Thrust Bearings



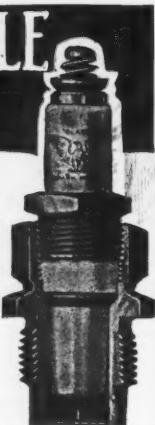
**BLACK EAGLE**  
Spark Plug

50c. IS ENOUGH  
The "Black Eagle" Spark Plug marks the dawn of a new era. From now on The Price of Spark Plugs will gravitate to Fifty Cents.

Why not be a pioneer in your territory?

The reason is apparent—none better at any price. Made in all standard threads mailed upon receipt of price.

THE STANDARD CO.  
Torrington, Conn.



## Knox Automobile Co.

Springfield, Mass.

Plant, including equipment, machinery, supplies and merchandise, is to be sold under a decree of the U. S. District Court. This large plant, fully equipped, and having superior railway facilities, is now in active operation and has built up a large business in Fire Apparatus, Tractors and other lines.

Full particulars may be obtained by addressing C. G. Gardner, Trustee, Knox Automobile Company, Springfield, Mass. Meanwhile we are prepared to supply a large variety of pleasure cars, fire apparatus and tractors to those desiring the highest quality.



Model T Runabout.....\$500

Model T Touring Car..... 550

Model T Town Car..... 750

With Full Equipment f. o. b. Detroit

**FORD MOTOR COMPANY**  
Detroit, Michigan

**METZ** "Twenty-Two" Roadster

THE GEARLESS CAR

"No clutch to slip—no gears to strip."



**\$475**

Improvements Completely Equipped

Center control, left-hand drive, 4-cylinder 22½ H. P. water cooled motor, Bosch magneto, standard artillery wheels, best quality clincher tires, extension top, windshield, five lamps, gas generator, tools, etc. Makes 5 to 50 miles per hour on the high speed, 28 to 32 miles on 1 gallon of gasoline, and is a wonderful hill climber. A strong, reliable, stylish, fully guaranteed car. You can secure EXCLUSIVE SALE in your territory. Write at once for Book "K" and particulars.

METZ COMPANY

WALTHAM, MASS., U. S. A.

**UNIVERSAL JOINTS**  
**"SPICER"** MEANS QUALITY

"SPICER" on universal joints means quality, and "SPICER" quality has been a standard ever since universal joints have been manufactured.

Let us quote you prices on your requirements.

**SPICER MFG. CO., Plainfield, N. J.**

Domestic Representatives: K. Franklin Peterson, 122 So. Michigan Blvd., Chicago; Thos. J. Wetzel, 17 West 42nd St., New York. L. D. Bolton, 2215 Dime Savings Bank Bldg., Detroit. Foreign Representative: Benjamin Whittaker, 21 State St., New York.

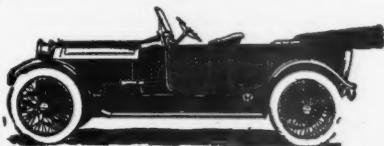
# HENDERSON

**KEROSENE BURNING CARS**

Twenty miles per gallon on kerosene or gasoline, as proven by cross-continent trip, a trip around the world and by cars in the hands of hundreds of satisfied owners—four and six-cylinder models.

Write for  
"Kerosene Facts"

Henderson Motor  
Car Company  
Indianapolis



## SOLAR LAMPS

A discriminating public has voted in favor of Solars—the quality motor lamps.

Backed by 15 years of specialization. Found on more high-grade cars than all other makes of lamps.

A Solar Lamp for every motor need.

**WRITE FOR CATALOG**

**THE BADGER BRASS MFG. CO.**  
KENOSHA, WIS.  
NEW YORK CITY

**WANTED:** Good representatives. The agency for JESCO electric starting-lighting equipment is a big asset to an electrical or accessory concern. With the JESCO you can secure a good business in making installations on cars in use. Some territory is still open. Let us outline our installation and service agency proposition.

Write for full particulars.



**Jones Electric  
Starter Company**

Jackson Blvd. and Loomis St., Chicago, Ill.

Standardized Transmissions

# COVERT

Covert Motor Vehicle Co.

Sales Office Detroit  
Factory Lockport N.Y.

*When Writing to Advertisers, Please Mention Motor Age.*

## Gas Saving and Back Fire Preventer

More power and less wear on the motor by vaporizing every atom of gasoline, thus attaining better lubrication.

**Prevents Back Firing and Makes Starting Easy**

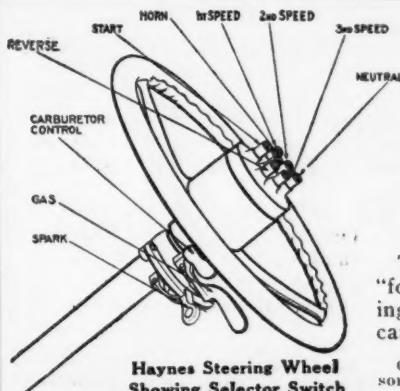
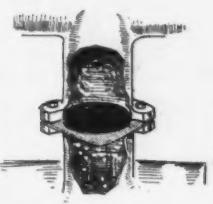
ECONOMIZES FUEL by going 50% further on a given amount of gas.

THE GAS SAVING AND BACK-FIRE PREVENTER is placed between the intake manifold and the carburetor. It's a device that is 100% perfect and saves its cost many times over in a season.

**Price \$3.00**

Sent prepaid upon receipt of price.

**GAS SAVING AND BACK FIRE PREVENTER COMPANY**  
125 E. 23rd Street, New York City



Haynes Steering Wheel  
Showing Selector Switch

The Haynes Automobile Co., 2 Main St., Kokomo, Ind.

## Electricity Shifts the Gears on the

**HAYNES**

*America's First Car*

Two "sixes" and a "four." Roadsters, touring and enclosed body cars.

Catalog covering this season's models upon request.

**\$2400**

Completely Equipped

**MOLINE**

More Power  
More Flexibility  
More Economy  
More Silence

**KNIGHT**

Four-cylinder,  
five-passenger,  
50 horsepower,  
128-in. wheelbase.

Bosch ignition,  
Wagner electric  
starting and lighting, \$2400.

The car of the future will not have poppet valves  
Moline Automobile Co., East Moline, Ill.

## WINTON SIX

**Keeping Ahead**

For seven years Mr. Winton has devoted himself to the perfection of a single model exclusively. He has had just one aim—to keep the Winton Six ahead of all other cars in beauty, comfort, mechanical excellence, and value. No wonder the 1914 Winton Six is the fashion plate of American motor cars.

Note this: Be careful in selecting a car this year, more careful than ever before. There are startling reasons why. We tell them in our Book No. 41. Shall we send you a copy?

**THE WINTON MOTOR CAR COMPANY**  
424 Berea Road, Cleveland, O.

*World's First Maker of Sixes Exclusively*

# Prest-O-Lite

is the most  
**RELIABLE**  
Lighting System

All the facts on  
All lighting systems  
Mailed you on request.

The Prest-O-Lite Co., Inc.  
233 Speedway Indianapolis, Ind.  
(Contributor to the Lincoln Highway)



## REPUBLIC STAGGARD TREAD TIRES

Republic Staggard Tread, Pat. Sept. 15-22, 1908

Among your friends are men—exceptionally keen, shrewd, far-sighted fellows—whose business judgment you respect.

These men are pretty sure to have the Republic Tire on their cars. Ask them what they think of it.

If you do this, your next tires will be Republics.

THE REPUBLIC RUBBER COMPANY  
Youngstown, Ohio

Branches and Agencies in the Principal Cities

# The Supreme Pullman

Model 6-46-A

A MODERN CLASSIC Price, \$2,350

Vulcan Electric Gear Shift \$150 Extra

For the first time, the rules of art have been applied successfully to automobile coach and chassis building. In its Model 6-46-A this Company firmly believes that the acme of human endeavor as applied to automobile construction has been attained.

Fours and Sixes—\$1,800 to \$3,000

WRITE OR WIRE

PULLMAN MOTOR CAR COMPANY, York, Pa.



## Every Crevice

and crack is penetrated with Whitmore's Auto Gear Protective Compositions, affording thorough and complete lubrication, and stopping car depreciation. If

### Whitmore's Auto Gear Protective Compositions

will show the phenomenal results we claim, you will surely want them on your car. Service tests will show to your entire satisfaction and beyond all doubt that we have not claimed one-half what these goods will do.

In ordering Whitmore's Compositions, be sure to state definitely for what part of car lubricants is wanted.

THE WHITMORE MFG. CO.  
Lubricating Engineers

33 Iron Court, Cleveland, Ohio, U.S.A.

Write for Interesting Booklet "Stop Depreciation"



**Dorris**  
Built to last

**THE SILENT CAR**

**BUILT TO LAST** Attention, Agents !!

We are offering a big, liberal proposition and unusual sales help to Agents on the

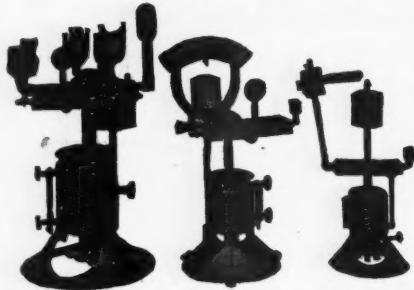
**1914 Dorris Truck & Pleasure Car**  
We sell "through" the dealer and not "to" him. Write today.  
DORRIS MOTOR CAR COMPANY St. Louis, Mo.

"48" "41" "32"

**MARMON**  
"The Easiest Riding Car In The World"

NORDYKE & MARMON CO.  
INDIANAPOLIS (ESTABLISHED 1851) INDIANA

**HAYWOOD STEAM VULCANIZERS**  
THE PROFIT MAKING PLANTS



The vulcanizing system that DOES NOT use air bags. SOLID PADS and HEAVY CLAMPS are the means through which pressure is generated.

Plants from \$25 to \$500  
Write for Catalog B.

**HAYWOOD TIRE & EQUIPMENT COMPANY**  
524 N. Capitol, Indianapolis, Indiana

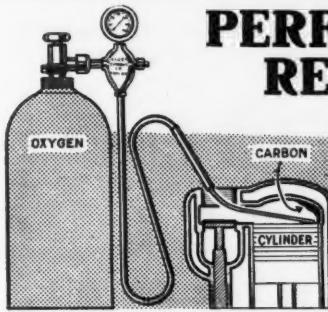
**Corcoran Lamps**  
GAS, OIL, AND ELECTRIC  
CORCORAN LAMP CO.  
CINCINNATI, OHIO

## A Jobbers Line



A LIVE money maker being catalogued by 100 Jobbers. Over 170 stock styles for ALL popular cars at RIGHT prices for guaranteed springs. Car agents can promptly obtain of Jobbers a 30% discount. Send for complete list and nearest Jobber.

**STOCKS IN 8 PRINCIPAL CENTERS**  
NEW ERA SPRING & SPECIALTY COMPANY  
803 Woodward, Detroit, Mich.



## PERFECT CARBON REMOVER \$10

Will remove all carbon from cylinders easily and in few minutes. Equal of any high-priced outfit. All parts guaranteed. Keeps up efficiency of cars and trucks. Big money maker for garages.

**Price \$10 (without oxygen tank)**

Usual price \$15. As we sell for cash only and no accounts carried, customers are given \$5.00 off on every outfit. Express companies allow inspection—you take no chances.

Sent prepaid—cash with order or C. O. D.

OXYGEN DECARBONIZER CO., 301 River Street, Troy, N. Y.  
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## CAMERON CARS

*Mechanically Excellent*

A remarkable lot of car value is contained in the 1914 CAMERON. Patented Four-Speed Transmission, Water Cooled, Electric Lighting and Starting. Price, \$1200.

See it. Examine it. Ride in it. You'll be convinced.

Get our literature—NOW.

**CAMERON MFG. COMPANY**  
NEW HAVEN, CONN.

## Brixtson Pneumatic Tires

At last the pneumatic tire problem has been virtually solved—the weak points in previous tire construction have been eliminated. The resiliency of a Brixtson Pneumatic Tire puts it in a class by itself. It is Puncture-proof—Blowout-proof—Skid-proof—Rut-proof—Rim-cut-proof—Oil-proof and Gasoline-proof.

### Ten Days' Free Trial

To remove all doubt that might arise in the purchaser's mind and to back up our statements—we will allow 10 days' free trial on the first set that goes into each town.

### Your Tires Can Be Made Like This →

If you are not in need of new tires and the fabric in your present tires is still good—we can rebuild them the Brixtson Way—making them Puncture-Proof, Non-Skidding, Blowout-Proof, Rut-Proof, Oil-Proof and Rim-Cut-Proof. Write today for full particulars, giving your dealer's name.

**THE BRICSTON MFG. CO.**  
1224 Brixtson Bldg.,  
Brookings, So. Dak., U. S. A.



When Writing to Advertisers, Please Mention Motor Age.

## Mosler Spit Fire Plugs are the BEST

FOR 13 YEARS HAVE BEEN LIKE THIS

INSIST ON OUR GENUINE PLATINUM POINTED PLUGS

A.R. MOSLER & CO.,  
P. O. BOX "M", MT. VERNON, N.Y.



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The Only set of Tires to complete the entire 500-mile race at Indianapolis, May 30, 1913. Consider that 88 Tires of other makes were changed in this Race. Our "Victory Folder" explains other races.

### Braender Rubber & Tire Co.

Main Office & Factory Rutherford, N.J. New York, 1987 B'way. Chicago, The Alfred Co. Boston, Dayton Tire Co. Pittsburgh, Keystone Motor Supply Co. Indianapolis, Brant Bros. Columbus, O., Franklin Rubber Co. Troy, N. Y., G. H. Snyder. Newark, N. J., Ketcham & Lawrie.



Established Agents  
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## PAIGE

**Model "36" \$1275.00**

A car whose design and construction is so far ahead of others at its price that it is in a class all its own. Gray and Davis Electric starting and lighting equipment, silent chain cam shaft drive, four inch by five inch motor, cork insert multiple disc clutch, 116 inch wheel base, left side drive, center control, and equipment complete to the last detail.

**Model "25" \$975.00**

Including Electric Starting and Lighting System

This model has made the Paige reputation. Such a sturdy, powerful, comfortable car has never been offered the public at anywhere near its price. \$975.00 with complete equipment.

Splendid Agency Proposition

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The performance of Eisemann Ignition Systems during the Indiana-Pacific Tour justifies every claim we have ever made for Eisemann efficiency and dependability.

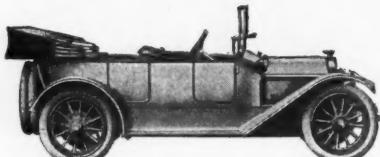
### The Eisemann Magneto Company

Sales and General Offices  
22-33d St., Brooklyn, N. Y.

New York Indianapolis, Ind. Detroit, Mich.  
128 W. 53d St. 514 N. Capitol Ave. 802 Woodward Ave.



# MERCER



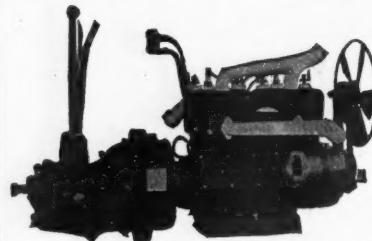
Series H—Close-Coupled Five-Passenger

A close-coupled five-passenger touring car suitable for long distance work, where speed and comfort are demanded.

*Send for Catalogue.*

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We beg to announce our latest four cylinder Unit Power Plant. This Motor includes the recognized engineering practice, here and abroad. "Craftsmanship of long experience is the result of this distinctive Power Plant."

Detailed information on request, and we are in a position to make prompt deliveries according to contract.

GOLDEN, BELKNAP & SWARTZ CO.  
DETROIT, MICH.

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THE WARNER MANUFACTURING CO.  
TOLEDO, OHIO

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## Complete "Vulcan Process" Of Oxy-Acetylene Welding Apparatus

including Carbon Burner (with drums for each gas loaned) \$67.50 to \$100.00. Plants with drums for each gas owned

**\$175 and Upwards**

Larger plants have most simple, positive and safe automatic acetylene generator ever placed on the market. Write us today for book on welding and apparatus.

Vulcan Process Co., Minneapolis, Minn.



KRUPP AUTOMOBILE CRANK SHAFTS, STEEL FORGINGS AND FRAME MEMBERS, GEAR BLANKS, KRUPP BAR STEEL BALL MILLS, TUBE MILLS AND OTHER MACHINERY

KRUPP RESISTANCE WIRE

USE KRUPP  
STEEL

Call for Krupp Steel In Your Car and See That You Get It

THOMAS PROSSER & SON

28 PLATT STREET

NEW YORK

KRUPP STEEL LOCOMOTIVE TIRES AND CAR WHEEL TIRES, CRANK SHAFTS, STEEL FORGINGS AND CASTINGS, STEEL TIRED CAR WHEELS, PROSSER BOILER TUBE EXPANDERS

CRUCIBLE IRON ROLLED

You can take a thousand miles of service out of a set of tires by driving them insufficiently inflated over ten miles of road.

Use the New Positive Lock Stop  
**TWITCHELL AIR GAUGE**

and save your tires.



"TIRE INSURANCE FOR \$1.00"

Simple, Accurate, Durable and Easily Read

For sale by Jobbers, Dealers, Garages, or

The Twitchell Gauge Co.

1201 Michigan Avenue

Chicago, Illinois.

## Have You Read This Week's Classified Columns?

They contain numerous advertisements of interest to you.

It makes no difference what you are looking for—whether a factory superintendent, salesman, foreman or chauffeur—you will find the man listed in MOTOR AGE classified columns.

# CLASSIFIED ADVERTISEMENTS

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of the  
Motor Car Industry

# MOTOR AGE

Rates-25¢ per line  
Minimum Charge \$1.00  
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## Cars For Sale

**BEST OFFER TAKES THESE DESIRABLE**  
motor cars. Six-cylinder, Model MX, Thomas; also four-cylinder Model F Thomas, both exceptionally fine propositions, the former essentially new. Owner removing to Pacific Coast. Must sell immediately. Postal brings full particulars. Address 418 Beard Ave., Buffalo, N. Y.

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Local dealer owes us some money we have agreed to take a car for it. Will sell for \$775.00 plus frt. C. E. T. Co., 366 Park Ave., Kenosha, Wis.

**FOR SALE—A 1910 STODDARD-DAYTON**  
Limousine, in first class condition. Price \$850.00. Lichtie Automobile Co., 1102 Madison Ave., Toledo, Ohio.

**FOR SALE—A 1912 FORD TAXICAB IN**  
good condition. Never run much. Will take \$550.00 or trade for new 1914 Ford Touring car. Ira Cadwallader, West Lebanon, Ind.

**FOR SALE—BRAND NEW 1912 STUDE-**  
baker "20," nickel trimmed, fully equipped, new tires U. S., price \$675.00. This model sold for \$885.00. One Studebaker "20" 1912 brass trimmed, fully equipped, used 700 miles as demonstrator, price \$565.00.  
Milford Auto Co.,  
Milford, Ill.

**FOR SALE—ONE 1914 WESTCOTT RUN-**  
about; one 1-ton truck; one  $\frac{1}{2}$ -ton truck; 4  $\frac{1}{2}$ -ton trucks; these cars are a bargain for someone, for a quick sale. W. H. Marble, 69 Main st., Brockton, Mass.

**FOR SALE OR TRADE—ONE MODEL 38-**  
30 H. P. Overland in good shape, \$375.00. One ton Buick truck, \$375.00. Special price for cash. Albany Auto Co., Albany Wis.

**FOR SALE—PACKARD, 30 1912, PHAETON**  
5-pas. Fine condition. Paint has original lustre. Driven only by owner. Price \$2,200. Address Lock Box 312, Milford, Ill.

**IN NEED OF IMMEDIATE CASH—WILL**  
sell my \$5,200 Knox Limousine, used one year, for \$1,000. Address D. Schane, 287 Edgewood Ave., Atlanta, Ga.

**LANDAULET LOCOMOBILE, JUST THE**  
thing for taxicab work; cost \$4,700. If you want a taxicab you would buy this on sight. Demonstration given. Price \$800. Cowles Tolman, 677 State St., New Haven, Conn.

**MITCHELL, REBUILT, GUARANTEED.**  
These cars are fully equipped. Call or write for further particulars.  
Mitchell Automobile Co.,  
2334-36-38 Michigan Ave., Chicago.

**MODEL 37 HUDSON ROADSTER, RUN**  
less than forty miles, as demonstrator only. Write for particulars. Union Motor Company, Lexington, Ky.

**MUST SELL SEVERAL ROADSTERS AND**  
touring cars. American Storage Co., 5025 Wabash Ave., Chicago, Ill. Tel. Midway 3233.

**PIERCE - ARROW CAR, PRACTICALLY**  
new, good condition, can be bought for less than half its original cost. W. S. Patton, Houston Land & Trust Co., Houston, Tex.

**TWO NORWALK UNDERSLUNG SIXES,**  
one year old, fully equipped, perfect running order guaranteed. Sacrifice for \$1,325 each; for quick action. Address Room 52, Berkeley Hotel, Martinsburg, W. Va.

**1913 NORWALK 35, 4-PASSENGER, WITH**  
complete electric system and horn. Fully equipped; Firestone Demountable Rims and five practically new tires. To quick purchaser, \$685. T. G. Coppersmith, Martinsburg, W. Va.

## USED CAR BULLETINS

For the past three years we have issued a weekly bulletin of high-grade used cars that we have for sale from time to time.

It gives preliminary information such as the model, number of cylinders, capacity and price.

A number of people have been receiving this list regularly. If you would like to receive it, simply drop us a card.

PACKARD MOTOR CAR COMPANY  
OF CHICAGO,  
2367 Michigan Ave.,  
Chicago, Ill.

## Parts and Accessories FOR SALE

**A. A. A. RADIATORS MANUFACTURED**  
and repaired. Radiators of any make repaired and returned same day. We can make any style Radiator to fit any car and ship in three days. New guaranteed Buick M 10 Radiators, steel shell to paint, exchanged for old one and \$22.00.  
Sheppard Co., 1331 Jackson Blvd., Chicago.

**A GOOD WHITE STEAMER ENGINE GEN-**  
erator and burner and several other good parts cheap. Address Box E 20, c/o Motor Age.

**A SPECIAL OFFER THIS MONTH**  
on racing bodies for the Ford chassis.  
AUTO REMODELING CO.,  
1501-5 Michigan Ave., Chicago.

## ACCESSORIES FOR AUTOMOBILES.

### MONEY-SAVING PRICES

Buy your accessories here and save 25 to 100 per cent.

### WINDSHIELDS 30 CTS. ON THE DOLLAR

Zig-zag or rain vision, also clear vision. Single or double section, brass, black or nickel. These windshields are all brand new, of the highest grade of material and workmanship. Guaranteed to be exactly as represented or money refunded.

### TOPS.

New Flanders "20" Touring car tops, made of the best mohair complete with irons, side and storm curtains; can be made fit Ford or Buick "10" touring cars; will fit other small touring cars. Price, \$11.85.

### WE ARE MONEY-SAVERS.

High grade accessories only. No matter what you need, get our Money-Saver before you buy. We guarantee a saving of 25 to 100 per cent on your supplies.

ERWIN GREER & COMPANY.

1456-64 Wabash Ave., Chicago, Ill.

Accessory Department.

**ACCESSORY CATALOG MAILED ON REQUEST.**  
Dealers send list of wants for special prices. Westchester cup grease bbl. lots 4c pound. Westchester Accessories Co., 1777 Broadway, New York City.

**A THREE-SPEED SELECTIVE MITCHELL**  
transmission, \$35.00; Bosch D-U-4 duplex magneto, \$30.00; 3-speed Brown-Lipe transmission, \$35.00; front seat covers, \$2.50 each; rear seat covers, \$5.00 each; pistons, \$5.00 each; crankshafts, \$10.00 up.

AUTO SALVAGE CO.  
1436 Wabash Ave., Chicago.

**ALL PARTS FOR HALLADAY CARS.**  
Ford and other owners write for tire list; something interesting.

AUTO PARTS CO., MINNEAPOLIS, MINN.

**"AMERICAN UNDERSLUNG" AND "MAR-**  
ion" Motor car parts and service.

CHAS. E. REISS & CO., INC.  
1690 B'way., New York.

**A TOP, CUSHION OR BACK, NEW OR RE-**  
covered. Curtains, new lights in Curtains. Carpet, Rugs, etc. Newton & Son, Cortland, N. Y.

**ATTENTION!**—To Ford Dealers and Owners. Get a Tandem Front Radius Rod Brace and Axle Aligner. Lines up the axle with a turn of a wrench, and keeps it there. No more bent radius rods. Gives you perfect safety. Quickly attached. Price \$3.50. Special proposition to dealers. A. S. Halls, Ortonville, Minn.

**ATTENTION, GARAGE MEN!**  
Make your carbon burning outfit portable by using our portable all-steel truck for Linde tank. It will save you time and money. Write for circular and prices.

Pioneer Welding & Mfg. Co.  
619 E. Main St. Kalamazoo, Mich.

### ATTENTION—HENRY OWNERS

Having purchased the repair business of the Henry Motor Co., we are prepared to fill orders promptly for repairs for Henry cars. Muskegon Automobile Co., Muskegon, Mich.

**AUTO TOPS BUILT AND REPAIRED.**  
Seat covers and body building, remodeling and trimming. Write for prices.

BITELY TOP & BODY CO.  
404-410 Laflin St., Chicago, Ill.

### BALL & ROLLER BEARINGS

All Types and Sizes.  
We also repair or exchange all makes of ball bearings.

THE GWILLIAM CO., 253 W. 58th St., N. Y.  
1314 Arch St., Philadelphia.

### BARGAINS—NEW RADIATORS.

Buick, model 17.....	\$30.00
Staver, various models.....	\$30.00-35.00
Midland T 4.....	35.00
Cutting, various models.....	30.00
Brodesser truck.....	35.00

### FOREDOOR BODIES \$10.00

Foredoor 6-passenger bodies painted green, red, blue or brown, not upholstered. Send for photograph and dimensions. When crated, extra \$2.00. Size 34x101. Price \$10.00.

### OTHER BARGAINS.

Exide Storage Batteries, 6 volt, 40 ampere .....	\$ 7.00
Auxiliary seats, black leather with holding brackets, pair.....	22.00
Troy windshields, nickel and black rain vision, \$40.00 value.....	12.50

### GET LIST OF OTHER BARGAINS.

AUTOMOBILE APPLIANCE CO.

1714 Michigan Ave., Chicago, Ill.

**BARGAINS—BARGAINS—BARGAINS**

Is the only thing we handle, from a cotter pin to a complete car. Small and high powered cars, engines, frames, bodies, axles, radiators, transmissions, magnetos, tops, etc. Before buying let us quote.

Pacific Motor Car Exchange Company,  
10 West 62nd St., New York.

**BRAND NEW ATWATER KENT**

Outfit, cost \$36; sell.....	\$ 20.00
Brand new Brown Lipe transmission and multiple disc clutch in oil. Unit. Cost \$100.00; sell.....	50.00
New Detweller steering gear, 18-inch wheel, complete.....	10.00
30 H. P. engine, 4 cyl., 4 cycle; model L Schebler carburetor, fan & pump, complete.....	55.00
1 steel frame for 120-in. wheel base.....	5.00
1 rear axle shaft drive.....	25.00
1 front axle.....	10.00
4 30x3½ wheels, roller bearing.....	8.00
1 chain drive axle Dandy for jack shaft for truck.....	10.00
5-passenger body; good upholstering..	20.00
Separate, or price complete.....	180.00
BOX 252, MANSFIELD, O.	

**BODIES, WINDSHIELDS, WHEELS, TIRES.**  
1914 New Ford T Roadster Bodies With Tops, \$50 Each. Taken off new cars we changed to delivery cars. Open express bodies \$15 up. New windshields, clear vision \$10. 32-inch solid rubber tires on wheels only \$12. Slightly used 34x4 detachable tires \$14, tubes \$3; like new and firsts. Benedict, 63 Winder St., Detroit, Mich.

**CHAUFFEURS MEMO PAD ATTACHED**  
to steering wheel, special price, 30c; adjustable Accelerator Heel Rest, \$1.50. Orders filled promptly. H. C. Rich, 316 W. 44th St., New York.

**CUT-OUTS.**  
E.M.F. Flanders, Buick, Regal, etc. Complete outfit with brass lock open pedal, \$1.50. Lincoln Machine Shop, Lincoln, Ill.

**DETROIT ATTACHABLE FORE DOORS**  
For E M F, Ford, Hudson, etc. One-piece aluminum. Easy to put on.  
DETROIT FORE DOOR CO.  
66 E. Ford St., Detroit.

**DOES YOUR MOHAIR AND CANVAS TOP leak?** Coleman's Waterproof Filler will make it rain proof. It will not stiffen or change the color. Virginia Waterproofing Corp., Arcade Bldg., Norfolk, Va.

**DIRECT FACTORY SALE****THE WARREN MOTOR CAR COMPANY**

are closing out all surplus stock of new auto parts at prices that demand quick sale:

\$ 1.00 spark plugs.....	\$ .19
150.00 full floating rear axle.....	50.00
30.00 front axles.....	12.50
50.00 pressed steel frame—all sizes.....	10.00
100.00 auto bodies.....	30.00
60.00 radiator—many sizes and styles	15.00
100.00 magnetos.....	35.00
8.00 iron vises.....	3.19
15.00 electric horns.....	3.98
5.00 complete tool kits.....	1.09
50.00 steering gears.....	12.19
10.00 Gasoline tanks—square.....	1.00
18.00 oval and round tanks.....	3.00

Anything else? We have it. Send for a Big Bargain list of new goods being sold at this sale. Get on our mailing list.

Hundreds of other automobile parts and accessories are shown on our Big Bargain Sheet of goods sold at this sale.

Write for this quick.

WARREN MOTOR CAR CO.,  
51 Tenth St., Detroit, Mich.

**FORD.**

Racing bodies; bucket seats; running boards linoleum covered, brass bound. Also write us for catalog on commercial bodies and inclosed glass tops.

AUTO REMODELING CO.,  
1501-5 Michigan Ave., Chicago.

**FORD AGENTS.**

SAGER FORD SHOCK ABSORBERS.  
30 days' free trial. Write for special prices.

Ford Fan Belts, 25c.  
FRED ALLEN AUTO SUPPLY CO.,  
1610 Michigan Ave., Chicago.

**FORD AGENTS AND ACCESSORIES**  
dealers. Write for our Ford Specialty Catalog and best jobbers' discounts. Everything for the Ford. The Browne Supply Co., 126 Erie St., Toledo, Ohio.

**FORD! ATTENTION FORD!**  
New Stock.

Just Received.

STAM-FORD BRAND

"FORD SPECIALTIES"

Owners, dealers and jobbers, send for our 1914 catalogue, out Feb. 10.

JOHN B. STAM & CO.

Manufacturers of Ford Specialties.  
1789 B'way. American Bldg., N. Y.

**FORD DEALERS GET OUR AGENCY FOR**  
Ford Spare Wheels. All wheels interchangeable. "Angier's," Streator, Ill.

**FORD OWNERS AND DEALERS!**

You will save trouble and money by installing our timer elevating device.

Ford Parts Specialty Co.,  
1211 Main St., Richmond, Ind.

**FORD OWNERS — PURDY EXHAUST**  
horn for Fords is being used everywhere—positively will not clog or choke. Write today for catalogue. DEALERS ask for prices.

Purdy Bros. Co., 49 E. 55th St., Chicago.

**FORD, HUPP AND MAXWELL**

Muffler cut-out, machined ready to attach, including lock open pedal string and cables, \$1.35. Lincoln Machine Shop, Lincoln, Ill. o

**FORD OWNERS, OUR PURE WHITE FELT**  
washers for Ford rear axles, stop grease leak, 20c set four, prepaid. Angier's, Streator, Ill.

**FORD OWNERS**

K. W. MASTER VIBRATORS

Reg. Price \$15.00. OUR PRICE \$12.50  
Latest type with kick switch  
Do you want our Catalogue?

THE M. & M. COMPANY  
CLEVELAND'S LARGEST SUPPLY HOUSE  
480-500 Prospect St., Cleveland, Ohio.

**FOR SALE—ANY PART OF MODEL 17**  
Buick, including body; in first class condition. Motor, transmission and rear axle parts in A-1 condition. We offer Model 38, 47 and 40 Overland parts. All prices attractive.

P. O. Box 393, Bainbridge, Ga.

**FORD OWNERS—WE CAN MAKE YOUR**  
car the easiest rider made with light or heavy load; no jolt, no jars, no upthrow. Write us. Thomas Auxiliary Spring Co., Canisteo, N. Y.

**FOR SALE AT A BARGAIN. NEW 5x6**  
four-cylinder, governor controlled engine, fully equipped with carburetor, magneto. Will sell for much less than cost. Fred Hanson, 570 Prior Ave., St. Paul, Minn.

**"FOR SALE—FORTY HORSEPOWER RUTENBERG Motor, with Bosch High Tension Magneto, \$85.00. 1910 National Chassis with \$40.00 Radiator \$100, or all for \$150.00.**  
Box 117, Concord, N. C."

**FOR SALE—PARTS.**

Transmission gears and steel brake drums for 1910 Empire roadsters. Complete lot procured from manufacturers who made rear axle transmission used in this car. Interesting prices on single pieces or in quantities.

E. T. KLEE,  
2634 Station St., Indianapolis, Ind.

**FORD T. OWNERS.**

Foot throttle or accelerators, \$1.50. Lincoln Machine Shop, Lincoln, Ill.

**FORE-DOORS AT CUT PRICES**

Mr. Auto Owner and Dealer: If your car is without fore-doors, write today for bargain prices; to reduce stock.

DEPT D., AUTO SPECIALTY MFG. CO.

326-30 E. Market St.  
Indianapolis, Ind.

**GUARANTEED RADIATORS.**

Not always necessary to buy new radiators. New cores can be furnished for frozen or damaged radiators. We build the fin and tube type. Guaranteed copper fins and tube.

Ford Model T core.....	\$14.00
Ford R. S. & M.....	23.00
Hupmobile 20.....	23.00
Hupmobile 32.....	30.00
Warren 30.....	25.00
Warren 40.....	30.00
E. M. F., Patterson, Cole 30.....	30.00
Flanders 20, Paige 1912.....	25.00
Buick 10, 14, 32 and 33.....	25.00
Buick 16, 17, 18, 19, 21, 26, 27.....	30.00
Hudson 20.....	25.00
Hudson 33, Cadillac 30.....	30.00
Paige 1910, 1911.....	23.00

The above is the price of cores only. Where casings are damaged beyond repair, add \$5.00.

All our work guaranteed absolutely new—built to your order. Do not be misled, cores cannot be rebuilt. Write for price on radiators not mentioned in above list.

HURON RADIATOR & LAMP COMPANY,  
253-255 Jefferson Avenue,  
Detroit, Mich.

Terms: Cash with the order.

FOUR (4) GUARANTEED SPARK PLUGS  
for \$1.00.

J. C. BROWN,  
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**FRONT DOORS****PRICES CUT**

We manufacture front doors for all old models. We can give you prompt shipment and guarantee the doors to fit or money refunded.

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1332 Michigan Ave., Chicago, Ill.

**GET WHAT YOU PAY FOR**

Our Hydrometer tells you exactly what grade gasoline you are getting. Sent prepaid, complete with glass jar and case for One Dollar. 25,000 sold this year. Send for yours today.

MARSHALL, WALTER & CO.,  
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GRIND YOUR OWN CYLINDERS IN YOUR  
own shop. Save Money. Make Money. Perfect Work. Lowest Cost. No rotating of cylinders required on the Acme Grinder. Particulars on request.

ACME GRINDER COMPANY,  
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LEVENE MOTOR CO.,  
Sole manufacturers and distributors of

LION MOTOR PARTS CO.

LOUIS J. BERGDOLL MOTOR CO.

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We have purchased the entire stock of parts, jigs, patterns, drawings, etc., of the above mentioned companies, and are prepared to fill orders for repair parts for all models of these cars; give name and number of cars when ordering parts. Price list on application.

LEVENE MOTOR CO.,  
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MAGNETOS EXCHANGED.  
BOUGHT AND SOLD.  
We repair any make of magnetos and coils.

FORD MAGNETO CO.,  
2610 Locust St., St. Louis, Mo.  
Telephone Bonmot 65; Central 9570L.

**MAXWELL AGENCIES AND ALL  
GARAGES.**

For immediate acceptance only we offer three Drive Pinion Support Bearings, No. 823, for \$6.00. Postage paid. One only, \$2.25.

NATIONAL MOTOR GOODS CO.,  
118 N. Third St.  
St. Louis, Mo.

**MAGNETOS: WE HAVE 2,000 MODEL X**  
Splitdorf Magnets, new. Price, without coil, \$17.50 each; with coil, \$25.00 each.

The regular price of these is \$75.00.

We also have other makes of magnetos at cut prices—in fact, everything for the automobile. Send for "OUR PRICE WRECKER"—the greatest money saver in the world.

**TIMES SQUARE AUTO CO.,**  
1210 Michigan Blvd., Chicago, Ill.  
S. W. cor. 56th St. & Broadway, N. Y. City.

#### MICHIGAN, MORA AND DRAGON PARTS.

We have maintained the exclusive repair parts business of the Dragon Car since 1907 and on the Mora Car since 1910. We recently purchased the bulk of the stock and all repair parts of the Michigan Cars necessary to maintain the best service in this car also.

This stock together with our unexcelled machine shop equipment should afford Michigan car owners better service than the makers of the car could give. Our revised price list is now ready for distribution, same will be furnished on application, giving model, style and year of car.

**PHILADELPHIA MACHINE WORKS,**  
61-71 Laurel Street, Philadelphia, Pa.

#### MOTOR OWNERS ATTENTION.

National Oxygen Carbon Remover, Fully Guaranteed, \$10.00. Don't buy unnecessary attachments, we will let you try this machine thirty days. National Sales Company, 210 Midland Building, Kansas City, Mo.

**NEW FORD TOURING CAR BODY WITH**  
top and side curtains complete, painted and upholstered, crated, f. o. b. Toledo, \$68.00. MacInnis Bros., Toledo, Ohio.

#### PEERLESS EXTRA FINE BLACK JAPAN

The finest air drying black enamel for all-around work on automobiles. Use on all kinds of metal or wood. Dries with a gloss finish. Ask your dealer.

**THE COLUMBUS VARNISH CO.,**  
Columbus, Ohio.

**NEW FOUR CYLINDER AUTOMOBILE**  
and 2 cylinder stationary engines. We solicit all kinds of machine work and guarantee satisfaction.

Alford Motor & Machine Co.,  
Goshen, Ind.

#### PEERLESS EXTRA FINE BLACK BAKING

JAPAN  
Bakes to either a high gloss, egg shell gloss or dull finish on all metal parts of automobiles. One coat covers solid. Ask your dealer.

**THE COLUMBUS VARNISH CO.,**  
Columbus, Ohio.

#### NEW OR USED, TRIMMED OR UN-

trimmed automobile bodies, suitable for repair or rebuilding jobs. Will sell cheap.

**IGOU MOTOR CAR CO.,**  
4333 Warne Ave.,  
St. Louis, Mo.

#### PEERLESS CYLINDER ENAMEL

Will finish the metal parts a smooth black finish which will not be affected by heat, grease or gasoline. Ask your dealer.

**THE COLUMBUS VARNISH CO.,**  
Columbus, Ohio.

#### PAINT YOUR CAR YOURSELF

Save \$25 to \$75 by doing the work at home with the Arsenal system. Our big free booklet, "The Car Beautiful," tells how. Send for it today.

**ARSENAL VARNISH COMPANY,**  
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**RACING GEARS, \$9; WINDSHIELD, \$5;**  
side lamps, \$1.50 pair; Knox body complete, \$25; etc. Will buy good lathe. A. J. Parcell, Elgin, Ill.

#### PEERLESS JET BLACK FENDER JAPAN

A rich black enamel to finish fenders of automobiles. One coat covers solid. Air drying in thirty-six hours. Ask your dealer.

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NEW.	NEW.
Ford T.....	\$17.00
Buick F, 16, 17, 19, 26, 27, 28.....	30.00
Buick 10, 14, 32, 33.....	22.00
Hudson 20.....	28.00
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All other makes at equally low prices. Send us your old radiator for repairs or exchange on a new one.

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Brightens and renews the finish on all varnished surfaces of automobiles. A varnish food and life restorer. Ask your dealer.

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"Put up a good front" by putting on our genuine guaranteed cellular radiators (commonly called Honeycomb).

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Buick 10-24-25-34-35-36.....	27.50
Buick 16-17-19-26-27-28.....	35.00
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Equally attractive price on all popular models. Every one a new complete radiator. Five per cent discount allowed for cash with order.

**DETROIT RADIATOR & SPECIALTY CO.,**

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#### RADIATOR COVERS FOR ALL CARS.

Every car should have a radiator cover in cold weather.

Write for prices.  
Auto Cape Top Co.,  
2334 Michigan Ave., Chicago, Ill.

#### "SAVE YOUR GASOLINE."

We have 150 Rayfield carburetors, regular \$20.00 kind. Our price, \$8.20 while they last.

PURITAN MACHINE CO.,  
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**RADIATORS THAT COOL THE MOTOR**  
and give satisfaction are W(RIGHT). Built for all cars. We have in stock—

Ford T. and all Buick models.

Michigan F-1911. Velie 30-1909.

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Most accidents are caused by "cloudy" glass fronts. Our patented glass front cleaner removes rain, snow and "breath-steam" from windshield instantly. Made of brass; cannot rattle; always ready; operates from driver's seat. Send two dollar bill for one today and be safe. Tomorrow you might have accident costing two thousand, maybe life. MARSHALL, WALTER & CO., Milwaukee, Wisconsin.

**SCHEBLER MODEL "L" CARBURETORS.**  
new 1½-inch, \$8.00 each. Order early.  
Kent Motor Car Co., Kenosha, Wis.

**SCORED CYLINDER AND CRACKED**  
water jackets, easily repaired by any garage or repair man with my new discovery with practically no expense. A big money maker. I will send you my receipt guaranteed to do the work for \$10.00. Address

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More than ten thousand Ford cars are equipped with our seat covers. It will pay you to write for samples and prices.  
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Dept M., Racine, Wis.

#### SHINAUTO — THE GREAT PRESERVER.

Keeps auto like new without washing. Prevents cracking and checking of varnish. Makes old cars like new. Guaranteed. Saves paint bills. Trial can 50c by mail. Enough for two months' treatment.

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1137-1139 No. Illinois St., Indianapolis, Ind.

**SILVER PLATE YOUR BRASS TRIMMINGS**  
for \$1.00 with Century Silver Plating. Applied like brass polish; sample 10c, postpaid; large size \$1.00. Century Co., Little Bldg., Lincoln, Neb.

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We have 200 Prest-O-Lite large size Gas Tanks, new, complete—worth \$25 each. Your Money Order or Certified Check for \$12 brings tank complete by return express.

**CUT PRICE GAS TANK SALES CO.,**  
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#### STOP! NO GAS.

Our gasoline gauge tells you exactly the amount of gas in your car. Just state car. Put 15c in stamp in envelope and mail. Sent prepaid. 126 Erie St., Toledo, Ohio.

**STOP THAT LEAK IN YOUR RADIATOR**  
with one ounce of Overton's Radiator Leak Compound. A pound can by parcels post for 35c cash. N. L. Overton, 1109 4th Ave., Council Bluffs, Iowa. Prices to Dealers.

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Patented lock for Ford and other small cars. Impossible to start motor. Two keys with each lock. Sent prepaid, \$1.50. May save price of your car.

**MARSHALL, WALTER & CO.,**  
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**TOPS BUILT, RECOVERED AND RE-**  
paired. Also Top Covers, Radiator Covers, Luggage Cases, Celluloid, etc. C. G. Meyer & Son, Tiffin, Ohio.

**TOURING ROADSTERS, RACING BODIES,**  
Seats, special and stock sizes. Radiators, hoods, tanks and fenders for any car. Get our prices.

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#### THAT MYSTERIOUS RAG DUSTER.

For dusting and polishing automobile bodies, windshields, lamps, pianos or any other polished surface. House Size 25c. Automobile Size 50c. Sent to any address upon receipt of price. If not satisfied, return duster and we will refund purchase price.

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**TRUFFAULT - HARTFORD SHOCK AB-**  
sorbers: \$45.00 kind; \$20.00 set of four.

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Manufacturers of Portable (weight 40 lbs.) and stationary welding, cutting or lighting plants; supplies of all kinds. Agents wanted. Fulton & Enfield St., Brooklyn, N. Y.

**WE HAVE JUST TAKEN IN EXCHANGE**  
2-ton Saurer chassis in fine condition. 4 speed transmission direct on 3d, 4 cyl. long motor. Bosch high tension magneto. Condon, 2635 Wabash Ave., Chicago.

**WE HAVE SEVERAL SLIGHTLY USED**  
magnets which we will sell very cheap.

**LUVERNE AUTOMOBILE CO.,**  
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**WARNING — THE PATENT ON OUR**  
(TOWNSAN VALVE ADJUSTER AND  
SILENCER) A (FORD) SPECIALTY, COM-  
PRISING A SPRING CYLINDER AND  
THIN STEEL DISKS WAS ISSUED JAN.  
27, 1914. JOBBERS AND DEALERS ARE  
WARNED THAT WE SHALL PROTECT  
OUR INTERESTS. SUIT WILL BE IN-  
STITUTED AGAINST MANUFACTURERS  
ILLEGALLY MAKING THIS DEVICE.  
Townsman Auto Specialty Co., Mitchell, S. D.

**WELDING PLANTS THAT ARE SAFE.**

\$50.00 to \$175.00. Carbon remover with each welder. Your credit is good with us. The welder pays for itself and you save the middleman's profit. Write for terms. Address Manager, Dept. G.  
BERMO WELDING APPARATUS CO., Omaha, Neb.

**WE MAKE FORD RACING TYPE BODIES**  
in several models for immediate delivery.  
AUTO SHEET METAL WORKS,  
1532 Michigan Ave., Chicago, Ill.

**WE TEAR 'EM UP AND SELL THE PIECES**

We want old autos, condition no object. We will buy anything for the auto. We have all kinds of parts, many of them new, at unheard of low prices. Tires and tubes, many new, others used. Kingston carburetors, all sizes; will exchange for others. Gears of all kinds, new gas oval tanks, new timers, magnetos, coils. Stewart speedometers, shafts and chains, tire covers, dust hoods, electric horns, new brass bumpers, lamps, all kinds, Prest-o-Lite tanks, oilers, cylinders, pistons, transmissions, crankshafts, seats and bodies; new 30x3½ wheels, many other used sizes; rims; several chassis without engines, 2-cylinder, 4-cylinder, 6-cylinder engines, springs; in fact, everything that an auto needs. Correspondence solicited. If we do not have it, will advise you where you can get it. Anything bought can be returned at once, unused, carriage prepaid and we will refund amount paid.

AUTO WRECKING CO.,  
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KANSAS CITY, MO.

**WESTON MOTT HIGH GRADE REAR**  
axles, \$45.00. Other bargains, too.  
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**WHEN BUYING FORD SPECIALTIES,** look for the APCO on the box. If you see this trade mark, you are safe in every way, for it means "Every sale a sale of satisfaction." Your money will be cheerfully refunded if you are at all dissatisfied. The APCO goods cost you no more, so insist and don't let your dealer sell you "something just as good" and on which all sales are final. He makes more money, but where do you get off? Remember if your dealer won't refund your money, we will. You buy APCO and let the other fellow get the imitation.

AUTO PARTS CO., PROVIDENCE, R. I.  
The originators and largest manufacturers of Ford Specialties in the world.

**50 H.P. CONTINENTAL MODEL E**

four-cylinder motor with governor	\$300.00
50 HP. Model Gas Engine Co. motor with magneto, carburetor and governor	250.00
Four cylinder motor 3¾x4, new	90.00
Sliding gear transmissions, new 35 HP	35.00
Floating rear axle	50.00
I-Beam front axles	10.00
Runabout Bodies upholstered and painted	60.00
Five passenger bodies upholstered	60.00
Radiators, various sizes	15.00
Bosch magnetos	45.00
Remy magnetos	30.00
Splitdorf magnetos	25.00
Steering gears	7.00 and up
Seven passenger upholstered bodies with two extra seats	125.00
Pressed steel frames	5.00
Electric dash lamps, per pair	2.00
Ford mats	1.00
Ford wheel pullers	.75
Ford fanbelts	.30
Send for our Ford circular	
Rushmore generators, new, complete	4.00
Mosler Spitfire plugs, conical type	.35
Stewart speedometers, \$25.00 list	12.50
Ford special tailor made seat covers per set	13.50
Ford Tool Boxes, 22x9x6	2.50

SEND FOR OUR NO. 805 BARGAIN SHEET

AUTO PARTS CO.:  
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**50 NEW PRESSED STEEL FRAMES, 163"**  
long, 34" wide. Each, \$10.00.  
Send for sketch.  
Lucas & Son, Bridgeport, Conn.

**Cycle Car Accessories**

**CYCLE CAR ACCESSORIES**  
V Pulleys 1½x7, also flat belt pulleys 2x7.  
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**STEERING KNUCKLES, YOKES, FRONT**  
axes, springs, wheels, and friction transmissions.  
MINNEAPOLIS MOTOR CO. AGENCY,  
1123 Michigan Ave., Chicago.

**Cars Wanted**

**AUTO WANTED—WILL LOAN YOU**  
money on your car or sell same. American Storage Co., 5025 Wabash Ave., Chicago, Ill. Phone Midway 3233.

**FOR SALE—160 A. FARM IN NORTHERN**  
Minn. at \$20.00 a.; improved A1 land. Will take small auto as part payment. E. H. Keller, Marshalltown, Ia.

**WILL TRADE REGISTERED PERCHERON**  
Stallion for good Automobile.  
224 E. Harvey Ave., Wellington, Kan.

**Parts and Accessories  
WANTED**

**TOP WANTED.**  
Roadster top in good condition to fit Flanders (Studebaker); distance between bows about 3 feet 6 inches. Price must be reasonable. Holmin & Hough, Fairdale, Ill.

**WANTED—BUICK MODEL 17 SECOND**  
hand motor in good condition.  
CHARLOTTE AUTO COMPANY,  
Charlotte, Iowa.

**WANTED—SECOND GARAGE EQUIPMENT.**  
Lathe, Drill press, Large air compressor and other garage equipment. Write me what you have giving price and full description.  
C. P. Buswell, Meriden, Iowa.

**WANTED TO BUY—PREST-O-LITE AND**  
other make gas tanks for cash. Walter R. Ebert, 959 34th St., Milwaukee, Wis.

**Situations Wanted**

**EXPERIENCED SALESMAN HAVING**  
eight years experience selling automobiles desires to connect with a distributor who would appreciate the services of a business producer. Al references. Address Box E 17, c/o Motor Age.

**I KNOW TRUCKS.**  
A Mechanic wants position where motor transportation is not satisfactory or about to be installed. Address Box E 35, care of Motor Age.

**IF YOU CAN USE IN YOUR ORGANIZATION**  
a man of considerable motor car experience (administrative capacities), expert in sales and advertising supervision, I invite confidential correspondence. Initial salary nominal; results to establish basis of future remuneration. Address Box E 36, c/o Motor Age.

**POSITION AS CHAUFFEUR. PARTIES**  
desiring sober, reliable man, 5 years experience, drive or repair any make. Furnish best of reference. Touring preferred. Unmarried. Address C. E. T., Box 113, St. Elmo, Ill.

**POSITION AS FOREMAN IN MODERN**  
garage after April 1st. Single, American, age 30; 12 years repairing and running automobiles. Temperate. References. M. C. Hoyle, Lock Box 36, Warren, Mass.

**POSITION WANTED—SUPERINTENDENT**  
or assistant; 20 years of practical mechanical experience; 12 years executive; thorough knowledge of piecework and premium systems; a hustler and has always been very successful in getting results; at present employed in responsible position. Address Box E 25, c/o Motor Age.

**TOP DEPT. OR FACTORY SUP'T.**  
Man with 9 years' experience as head of top department and factory, desires similar position. Best credentials furnished. Address Box E 38, c/o Motor Age.

**SUPERINTENDENT & BODY DESIGNER**

wishes to make a change. Now employed as superintendent for one of the largest automobile shops in the Middle West. Fourteen years' experience in body building and can give the best of references from well known manufacturers. For further particulars address Box E 22, c/o Motor Age.

**Help Wanted**

**SALESMEN DESIRING A FINE, QUICK-**  
selling, profitable side line, should address  
GATES MFG. CO.,  
Indianapolis, Ind.

**SALESMAN FOR CITY OF 100,000 AND**  
some territory work. Good selling line thoroughly advertised. Exceptional proposition to real salesman. Order takers need not answer. Address Box E, 33, c/o Motor Age.

**SALESMEN WANTED FOR QUICK SELL-**  
ing automobile and hardware standard specialties; exclusive territory to live men. Motor Parts Co., 229-231 W. Erie St., Chicago, Ill.

**SALESMEN WANTED—TO HANDLE AN**  
excellent side line to the Garage and Motor Accessory Trade. Not a proposition for jobbers. A large company with an established reputation and with an advertised line can use a number of men. State line you are handling now, territory covered, references and consent of other houses represented required. Give full information. Address Gelhaus, 410 New St., Cincinnati, Ohio

**TRAVELING SALESMEN**  
Side line. I manufacture an article that sells to every repair shop and garage.  
D. Ogden, Columbus, Ind.

**WANTED—AUTO ACCESSORY SALESMAN**  
to carry our line either as a complete or side line. Offer an attractive proposition in any state. Box E 18, c/o Motor Age.

**WANTED — CARBURETOR SALESMAN**  
and demonstrator. Must give best reference. Address Box E 34, c/o Motor Age.

**WANTED—FIRST-CLASS AUTO REPAIR**  
man and lathe hand. Steady job to reliable man. Address Box E 31, c/o Motor Age.

**WANTED—HIGH-GRADE MAN TO SELL**  
motor truck trailers. In applying give age, experience, reference and salary expected. The Troy Wagon Works Co., Troy, Miami Co., Ohio.

**WE ARE CONSTANTLY IN TOUCH WITH**  
Employers requiring High-Grade Engineering service. Are you listed with The Toledo Engineering Agency, Toledo, Ohio?

**Wanted—Agents**

**AGENTS WANTED.**  
Attractive terms to dealers on our Ampvo Batteries. Some exclusive territory still open.

The Ampvo Battery Co.,  
3031 Michigan Ave., Chicago, Ill.

**AGENTS WANTED TO CALL ON GA-**  
rages, machine shops, factories, mills, etc., selling extensively advertised welding apparatus. Demand already created. Will give exclusive territory together with co-operation to right parties. Exceptional commission.  
COX BRASS MFG. CO.,  
Albany, N. Y.

**AUTO ACCESSORY SALESMAN WANTED**  
to sell our guaranteed auto tire reliners, double locks, inner and outer shoes, etc. Liberal commissions and exclusive territory.  
AMERICAN RUBBER PRODUCTS CO.,  
24 So. Clinton St., Chicago, Ill.

**AUTOMOBILE ACCESSORY AGENTS**  
Wanted—We are open for high-grade men in different localities to handle a necessary article for automobile owners. Excellent selling proposition. Small capital required. Address Box E 15, c/o Motor Age.

**EXCLUSIVE AND SIDE LINE SALESMEN**  
for spark plugs and accessories. Well established. Good chance for right man. Sturdy Mfg. Co., 2637 Mich. Ave., Chicago.

**MOTORISTS TURN LEISURE TIME INTO** money, selling tires to friends. Want local agents throughout Colorado, Wyoming, New Mexico and adjacent territory. Liberal commission. No investment required. Write for particulars. Boss Rubber Co., 1606 Broadway, Denver, Colo.

**YOU CAN GREATLY INCREASE YOUR** income by representing our line of lighting systems; our MATCH LIGHTING LAMPS sell like wildfire both in town and rural districts. No experience required, profits large, exclusive territory to right parties. Don't delay writing for free catalogue and full information. Doud Lighting Co., 175-F No. Sangamon, Chicago.

## Business Opportunities

**"ACCESSORY MANUFACTURERS."** High-grade Agency is open for proposition as direct factory representative in Philadelphia and surrounding territory. Strong influence with trade. Located on Automobile Row. Address Box E 26, c/o Motor Age.

**AN INVENTOR WOULD LIKE TO CORRESPOND** with a party with capital who would take an interest in an invention on an explosive mixture, a substitute for gasoline. This mixture is also an excellent engine cleaner. Address Frank Walch, No. 316 Augustine St., Rochester, N. Y.

**FOR SALE: GARAGE IN A PROSPEROUS** Western city; all modern; largest storing capacity. Ford Agency. Box E 30, c/o Motor Age. k

**FOR SALE OR TRADE—U. S. PATENT** No. 1073770—Internal Combustion Engine—single tapered rotary valve. L. O. Martin, Parkersburg, W. Va.

**FOR SALE—UP TO DATE MODERN** garage and auto supplies. Address Box E 11, c/o Motor Age. r

**FOR SALE—WELL ESTABLISHED** wholesale and retail automobile supply and tire business. In the South. Can show 30% net profit on the investment every year for five years. Poor health reason for wanting to sell. Will take \$30,000.00 to handle. Do not negotiate unless ready to accept proposition. Address Box E 27, Motor Age. a

**HAVE YOU \$5,000 TO INVEST IN MANUFACTURING.** After years experimenting have a carburetor of unusual merit for gasoline or kerosene different from those now marketed. Reference. No promoter. W. F. Pagel, 186 N. LaSalle, Chicago, Ills.

**INVENTIONS EXAMINED, PATENT AND** Working Drawings made. Models developed and built. Free report as to patentability and cost for development of your invention. Address Inventions, Dept. A, The Toledo Engineering Agency, Toledo, O.

### NEW BRICK GARAGE FOR SALE

Two cars, tools, etc.; doing a good business. Price, \$6,000; \$4,000 cash; four years time on remaining 2,000. It will sell soon at this price. Write at once or come and see. W. T. WOLFE, Lusk, Wyo.

**OPPORTUNITY FOR PARTY WITH \$5,000** to \$10,000 capital to secure Buick agency in one of Idaho's best cities; population 6,000. Randall-Dodd Auto Co., Ltd. Salt Lake City, Utah.

**WILL LEASE WELL EQUIPPED REPAIR** shop in live town in the sunny south to first-class auto repair man, middle aged married man preferred. No investment required. Shop will keep four or five men busy all year around. Address Box E 37, c/o Motor Age.

**WORKING 5 MEN STEADY AND WILL** sell out. Auto repairing and rebuilding six years. Machine shop complete. Good stock and tools. Particulars return mail. Box E 12, c/o Motor Age.

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**WANTED—EXCLUSIVE SPECIALTIES OR** patent right to manufacture by a well organized New York sales corporation. Suite 1928, 30 Church St., New York City.

## Wearing Apparel

**STOP! LOOK! READ! TWO WEEKS** clearing sale of fur lined overcoats. Lined with Australian mink, large persian lamb collar, black broadcloth outside, all sizes, \$25 each; real value, \$75. Examine before buying. Write today stating size. Enclose 50c for expressage and coat will be sent for inspection. E. Roberts, Suite 7, 160 West 119th St., New York.

## Portable Garages

**PRIVATE GARAGES, GALVANIZED** steel or wooden. The finest line offered. If interested write. GARAGE FACTORY, Beaver Springs, Pa.

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### AA1 GUARANTEED TIRES. WHAT MAKE DO YOU USE?

What size?  
Write for my price bulletins.  
We pay express charges.  
ALLEN S. SINSHEIMER,  
1503 Michigan Ave., Chicago, Ill.

### BARGAINS IN 600 NEW TIRES AND 400

used repaired tires. Any size.  
New. Used. New. Used.  
30x3 ... \$7.40 \$5.00 34x4 ... \$15.50 \$10.00  
30x3½ ... 10.50 7.00 36x4 ... 16.50 10.00  
34x3½ ... 10.50 8.00 35x4½ ... 19.50 11.00  
32x3½ ... 10.90 7.00 36x4½ ... 19.85 11.00  
36x3½ ... 11.50 8.00 37x4½ ... 20.50 12.00  
All other sizes in proportion.  
SERLIN TIRE CO.  
1073 W. 14th Place, Chicago, Ill.

### GUARANTEED TIRES DELIVERED.

30x3 ... \$9.10; 34x4 ... \$12.25; 32x3½ ... \$13.15; 34x4 ... \$17.60; 35 ... \$17.95; 35x4½ ... \$23.95. All sizes, also non-skid. 10% with order; order 2 tires. We deliver in central and southern states. We manufacture Vulcanizers for shop and private use.

VANDERPOOLS  
Springfield, O. Jacksonville, Fla.

I WILL SELL YOU CLINCHER OR straight side tires, either firsts or seconds, cheaper than any one in the United States.

D. OGDEN,  
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On Tires, Tubes and Reliners.  
New and used. Write for prices.  
ACME TIRE & REPAIR CO.,  
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Phone Calumet 3127.

### TIRE DEALERS AND GARAGEMEN !!

Write for our special tire bulletin on blemished tires. We are the lowest priced house in America on this class of goods.

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**ALL MAKES OF MAGNETOS AND COILS** repaired. Bought, sold and exchanged. Service station for Simms, Michigan and National. Mail orders given special attention. Get our prices before going elsewhere.

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**DUAL—DUPLEX AND INDEPENDENT.** Prices are low.  
BROWN & CAINE,  
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**SEND FOR OUR SPECIAL PRICE LIST** on new and used magnetos and coils. Repairs on all makes of magnetos.

PELLETS MAGNETO EXCHANGE,  
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Repaired, remagnetized; prompt service on all makes.

Get our exchange proposition on new K-W for old equipment. Spark Coil, Storage Battery and Carburetor Repairs.

Northwestern Distributors. K-W magnetos, Schebler carburetors, Vesta lighting equipments. Kellogg Self Starters and Tire Inflators. Reinhard Brothers Co., Minneapolis, Minn.

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**OUR SHOP IS EQUIPPED WITH EVERY** requirement for testing and repairing all makes of self-starters, magnetos and lighting generators; service station for Elba storage batteries and Gray & Davis generators and starters. The E. S. Cowie Electric Co., 1517 Grand Ave., Kansas City, Mo.

**STARTING AND LIGHTING SYSTEMS** and Storage Batteries overhauled and repaired. We charge no more for expert service than other concerns do for novices at the business. Rewinding of all kinds. Established in 1904.

PREMIER ELECT. CO., Not Inc.  
Tel. Wabash 4884.  
1123 So. Wabash Ave., Chicago.

## Rebuilding and Repairing

**AUTOMOBILE CYLINDERS REGROUND,** new piston and rings fitted. Garage Air Compressors, Cast Iron Brazing Co., Manchester, N. H.

ANDRE G. CATELAIN  
General Machine Work  
For Foreign and American Cars  
Welding all kinds of metal  
EVERREADY AUTOMATIC ENGINE  
STARTER SALES SERVICE  
Manufacturer Catelain Hose Coupling.  
1446-8 Indiana Ave., Tel. Calumet 1187  
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**AUTO SPRINGS REPAIR CO.**  
We manufacture and repair springs. Proper action compound put in springs. 1331 Jackson Blvd., Chicago, Ill.

**CYLINDERS REGROUND AND FITTED** with new pistons and rings for \$7 to \$11 per cylinder. We do this class of work exclusively and are thus able to give you the highest class of work at these prices. The Crown Machine Shop, Crown Point, Ind.

## CYLINDERS REBORED AND REGROUND

and fitted with my new light racing pistons, guaranteed to give 35% higher speed, power and economy. Also make gears of all kinds and push rods and piston pins of chrome nickel steel, hardened, tempered and ground, superior to factory; also cranks, connecting rods; send parts to the shop of quality.

McCADDEN MACHINE WORKS.  
St. Cloud, Minn.

**CYLINDERS REGROUND** and fitted with new pistons and rings for \$15 per cylinder. We make parts and cut gears of all kinds. Send us your old parts and we will repair or duplicate them in record time. Cracked cylinders, gear cases, etc., welded and made good as new. Aluminum, bronze and brass castings of every description.

THE ADAPT MACHINERY CO.,

1624 Wabash Ave., Chicago, Ill.

## CYLINDERS REGROUND.

We have special equipment for regrinding cylinders, fitting new pistons and rings. Prices, \$7.00 to \$15.00 per cylinder.

Autogenous Welding.

Magneto and Battery work.

Prompt Service.

BERNHARD & TURNER AUTO CO.,  
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**CYLINDERS REGROUND**

And fitted with new pistons and rings.  
EXPERT REPAIRING AND REBUILDING.  
Old parts satisfactorily repaired or duplicated. Cracked cylinders, gear cases, etc., perfectly welded and machined. Aluminum, bronze and brass castings of any design.

Hansen-Busch Auto Co.,  
23 Hubbard Place. Chicago, Ill.

**FORD**

**CYLINDER GRINDING,**  
**NEW PISTONS, RINGS, PINS.**

Our special equipment for grinding Ford Model T cylinders enables us to fit new pistons, new rings, and piston pins on short notice. A complete job better than new at prices that will interest Ford dealers as well as owners.

Write at once to  
**AUTO ENGINE WORKS,**  
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**GARDEN CITY SPRING WORKS.**

**NEW SPRINGS AND REPAIRS FOR ALL CARS.**  
2302 Archer Ave., cor. 23rd & Canal Sts.  
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Tel. Calumet 1081.

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C. E. Larson (Not Inc.) J. C. Beatty.  
**WELDING OF ALL KINDS OF METALS.**  
Cast Iron and Aluminum a specialty.  
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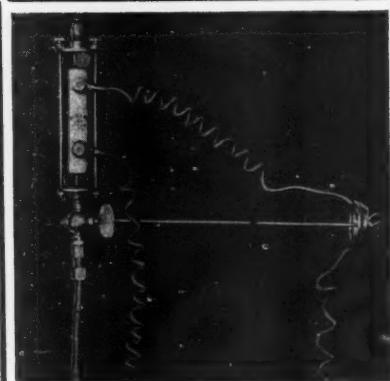
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**1914**

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Buyers of Vehicles should say—  
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**Phineas Jones & Company**  
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Write for it—right now.

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"Price Maintenance is the protector of the small manufacturer, jobber or dealer. Its suppression would mean the fostering of monopoly and the great capitalistic combination." —Louis D. Brandeis.

DETROIT, MICH., U.S.A.

February Tenth  
1 9 1 4

CFT/EVWL

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Philadelphia,  
Pa.

Gentlemen:-

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Respectfully,

Packard Motor Car Company,

*O.J. Jollzien*  
Purchasing Manager.

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### RESOURCES

We have the largest plants in the world devoted exclusively to the manufacture of balls and ball bearings—ample to take care of the larger portion of the world's demand.

### SERVICE

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Consult us before closing for your bearing requirements

## The Hess-Bright Manufacturing Co.

Front Street & Erie Ave.

Philadelphia, Pa.



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Perfect compression,—and as a consequence, maximum power,—can only be obtained when gas leakage is rendered impossible, and that result is only to be secured by the use of

## LEAK-PROOF Piston Rings

MADE IN  
ALL SIZES

EASILY  
ADJUSTED

The old style, one-piece piston ring in common use fails to check gas leakage because it is faulty in both design and construction. The *Leak-Proof* ring directly and completely overcomes these defects—thus. The opening in the old style one-piece ring,—necessary, of course, to secure elasticity,—is a constant source of leakage. In the *Leak-Proof* there is no unsealed opening,—the two halves interlock tightly, each one closing the opening in the other. The old one-piece ring is an eccentric ring, consequently its bearing on the cylinder walls is unequal,—gas will find its way by. *Leak-Proof* rings are concentric and with opposing points of expansion, so that perfect bearing is obtained always. They are made of special Processed Gray Iron of wonderful smoothness and elasticity—never losing their spring.

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on Over 150,000  
Automobiles



Sold by all  
up-to-date dealers, garages  
and repair shops.

Manufactured by  
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The 2-Piece  
Angle - Iron  
Construction

There's no leak proof ring but the **LEAK-PROOF** Ring — insist

# HUDSON Six-40

## Think How Many Want a Six Like This How Many Could You Sell?

A \$1,750 high grade Six.

A 2,980-pound Six.

With a streamline body—ideal equipment—extra tonneau seats.

Less price, less weight, less operative cost than any same-class Four. And the handsomest car of the day.

The Automobile Shows have this year revealed the tremendous vogue of the Six. Eighteen makers showed Sixes exclusively, and 54 of them showed Sixes for best. This out of a total exhibit of 79 makers.

In 1905 there were 196 exhibitors at the New York Automobile Show. Sixty-eight showed either single or two cylinder cars. They said the same thing about the development of the Four then as is now heard from some makers of Fours about the future of the Six. In 1907, however, not a single one or two cylinder motor was shown.

Men who buy cheap cars must still be content with Fours. But men who pay over \$1,500 will find everything—even price and weight and fuel cost—in favor of the Six. And thousands of such men buy cars every year.

### All Bars Down

The new HUDSON Six-40 removes every bar which held these men from Sixes.

Sixes have been costly. Now the HUDSON Six-40 far outsells any comparable Four.

Sixes have been heavy. Now the HUDSON Six-40 weighs 400 pounds less than the HUDSON "37"—our last year's Four.

Sixes have used extra fuel. Now the HUDSON Six-40 consumes one-fourth less fuel than the HUDSON "37," which had less length and power.

This is mainly due to a new-type motor—a small-bore, long-stroke motor—first developed by European engineers.

### The Handsomest Car of the Year

The HUDSON Six-40 also brings out an ideal streamline body, now the universal vogue in Europe, where body styles are set. These flowing lines, here as in Europe, have displaced the angle dash.

Many new attractions—new ideas in equipment—are embodied in this car. In all these things the HUDSON Six-40 is almost identical with the new HUDSON Six-54. And these two cars are widely considered the handsomest cars of the year.

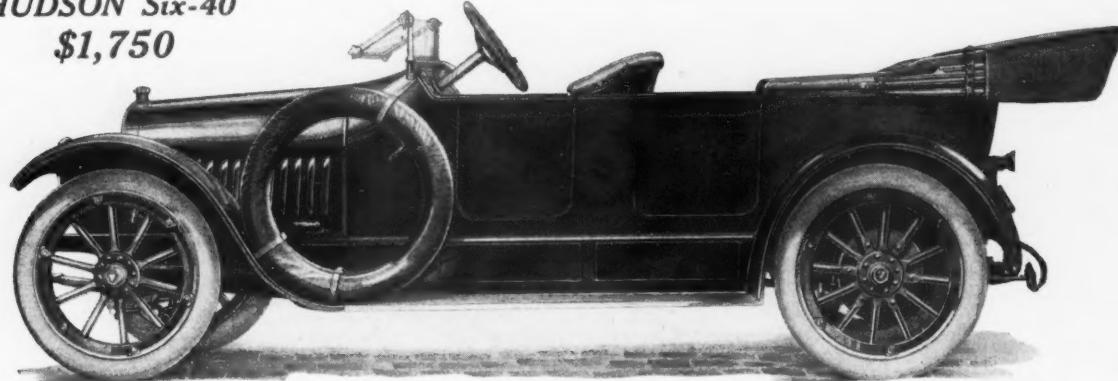
Both are designed by Howard E. Coffin, the famous HUDSON engineer.

The HUDSON Six-40 is the only quality Six selling under \$2,000. It is the most popular car which ever went from this factory. Dealers to whom this car appeals should write at once about it.

**Hudson Motor Car Co.**  
7798 Jefferson Ave., Detroit, Mich.

### HUDSON Six-40

\$1,750



Wheelbase, 123 inches.  
Seats up to 7 passengers.  
Two disappearing seats.  
Left side drive.  
Gasoline tank in dash.  
Dimming searchlights.

Extra tires carried ahead of front door.  
"One-Man" top, made of Pantasote.  
Quick-adjusting curtains.  
Concealed hinges.  
Concealed speedometer gear.

Delco patented system of electric lighting and starting.  
Integral rain-vision windshield.  
Hand-buffed leather upholstery.  
Electric horn—license carriers—tire holders—trunk rack—tools.

Price, \$1,750 f. o. b. Detroit.  
Wire wheels, with extra wheel, \$75 extra.  
Standard Roadster, same price.  
Cabriolet roadster completely enclosed, but quickly changed to an open roadster, \$1,950.  
(116)